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OPEN NETWORK PROVISION

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OPEN NETWORK PROVISION

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FITCE Looks into the 1990s

P. J. C. HAMELBERG†

This article, firstly, reviews the history of FITCE, its objectives and how it meets these objectives. The article goes on to discuss the changes in the telecommunications environment, particularly in Europe, and how FITCE is considering how it should change accordingly.

HISTORY

FITCE is a French abbreviation for *Fédération des Ingénieurs des Télécommunications de la Communauté Européenne*, or Federation of the Telecommunication Engineers of the European Community. The European Treaty was signed in 1957 and shortly after that, in 1961, representatives of the associations of telecommunications or PTT engineers (different from country to country) in the Benelux countries, France, Italy and the Federal Republic of Germany (known as *the six*) founded an association. The first meeting was held in Brussels. The initiative was taken by the Belgian and French associations and this was one of the reasons that, at that time, it was decided that FITCE should be, from the legal point of view, an association incorporated in Belgium. There is a special definition for this in Belgian law which is an international association with scientific and 'cultural objectives'. The statute was published in the Belgian Official Journal in April 1962 and this meant the official creation of FITCE.

As already stated, FITCE is an association on the basis of Belgian law; however, members of FITCE are not associations but persons. For practical reasons those persons are grouped in national associations, a national organisation of PTT engineers or an organisation of telecommunication engineers, etc., and that is different from country to country. Also, at the time of its creation, one of the bases of FITCE was that the requirement for membership was a university degree in engineering, but also that criterion does not exactly mean the same thing in the different countries. Furthermore, a possibility was created for non-PTT engineers, industry in particular, to become associated members. PTTs also felt very self-confident that the PTT was the 'centre of the world' and that there was nothing else, or not much, but this has very much changed.

After the 1960s, gradually the European Community expanded and other countries came into FITCE; the first was Ireland in 1975 and later on the members of what is now 'the 12'. Engineers from Spain were for some time associate members because at that time it was not officially a member of the European Community. Now members come from all of the 12 countries of the European Community, although in Denmark there are only a few individual members. At its creation in 1962, FITCE had 1100 members, and in 1989 nearly 5000. The central secretariat is in Brussels. Britain joined FITCE in the early 1980s, and I should in this respect mention Brian Wherry whose stimulating contribution to the Comité de Direction, the FITCE Board, has been very much appreciated.

OBJECTIVES OF FITCE

The objectives of FITCE are

- The development of science in the field of telecommunications—a scientific objective.
- The stimulation of cultural bonds and friendly relations—a social objective.
- To study problems which are of common interest to members of FITCE and which should be outside the areas normally already studied by institutions like the CCITT or CEPT or others. In practice, this is more directed to practical subjects in the exploitation of the operation of telecommunication networks and sometimes to subjects connected to the direct interests of engineers; for example, training facilities.
- To benefit from the experience of others. FITCE provides a very good opportunity to exchange information, to exchange experience, in an informal way by open discussion between members.

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FITCE IN OPERATION

How does FITCE achieve its objectives?

Firstly, each year, FITCE holds a Congress. The first was in Luxemburg in 1962 with 200 people participating; the 28th will be in Lisbon this year, and 700–800 people are expected, including the ladies. Each year, the Congress has a different theme; this year, for instance, the theme is 'European Telecommunications Facing up to 1992'. Three sub-themes have been defined: infrastructure and services, organisation and operations and the engineering profession, considering the consequences that the new developments are going to have for engineers as such. Each year, there are 25–30 speakers from all the Community countries.

Secondly, FITCE publishes the Review. This is published four times a year. It contains articles which are partly papers delivered at the Congresses, news from different PTTs or from different associations, and reports from the Congresses and from study commissions.

Thirdly, FITCE organises commissions. At present, just three commissions are in operation: one on the protection of cables, which is going to report soon, one about office automation, and a further one on training facilities.

Fourthly, mention must be made of the informal network of contacts which can be created by participating in FITCE activities. Those that work in headquarters and research certainly have international contacts in their own field of interest; they go to working groups, they know their colleagues in other countries who are doing more or less the same job. However, those working in the field or operational organisation in general have very few international contacts. FITCE is an excellent means to have international contacts, and to get in touch with colleagues in other countries who do similar jobs just to find out how they are doing it. It has been proven in practice quite often that if you want to know something from another country, you will certainly know someone, sometimes via FITCE, sometimes via other means, and it is useful to have these contacts in an informal way.

THE CHANGING ENVIRONMENT

Technology

Since 1961, much has happened. 1961 was still the time that semiconductors were slowly being introduced. We had analogue transmission and electromechanical switching and we had the PTT monopolies. International traffic was still rather difficult and, to make an international call in some countries, you would have to go to an office where old ladies in black were sitting and they would register your request and you would have to wait for another hour. I also remember that, even in the late-1960s, the outage of a UK–Netherlands submarine cable carrying 60 circuits was a major disaster.

Now the situation is quite different: digitalisation, VLSI techniques, ISDN and, of course, no longer monopolies but the deregulation or the introduction of competition in the arena of telecommunications operation; I think that you in Britain have set the example for the rest of Europe. There is only one problem: some people think that deregulation is very nice but that in practice it is just re-regulation, but I suppose that is one of the subjects of this seminar.

The European Scene

The environment in which the telecommunication operation is taking place has changed considerably since 1961. Competition is coming into telecommunications operations and that would mean that in many countries a split will exist between operators of networks and services on the one side, and the regulators on the other side. In the UK, there is the DTI and OFTEL, and BT and Mercury as operators. These developments were stimulated by the European Commission Green Paper, 1987. One of the main targets of the European Commission or the European policy in general is the opening of the markets for telecommunication products and for terminal equipment in particular. Therefore, we need standards and that was one of the reasons for the creation of what is now called *ETSI*—the European Telecommunication Standards Institute—created in 1988 and which in the meantime has been recognised by the European Commission in Brussels as a European standards body in the field of telecommunications.

An interesting aspect of ETSI is the type of membership it has, and that is something which could make us think about FITCE: whether we should also go in a similar direction. In ETSI, for the first time in Europe in fact, all the relevant groups in telecommunications co-operate on an equal basis: not only the administrations in the more formal sense of the word, the regulatory authorities and the public network operators like BT, but also the manufacturers, industry including trade associations, which are in fact the most numerous group in ETSI now, and then the users or associations of users and, on a smaller

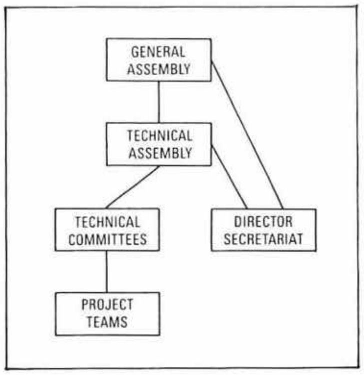

Figure 1
ETSI structure

scale, research bodies. The new thing is that, in this organisation, nobody is the leading one; at one time, it could be said that the PTTs were very much leading because of their monopoly position, but that is no longer true. In ETSI, good co-operation has been established between all those groups on the same level, on the level of equality; although, just to quote George Orwell, there are some people who think that some organisations are more equal than others. However, the principle that these organisations operate in ETSI on an equal level is important to maintain.

Figure 1 shows the basic organisational structure of ETSI. The technical standards work is done in Technical Committees which can be supported by *ad hoc* project teams for a limited time, mostly a few months up to a year. The Technical Committees operate in different technical fields and this is controlled by the Technical Assembly, which decides on the creation of committees but also puts the priorities and assesses the need to have project teams. Finally, the General Assembly has to approve the budget and is in charge of the general policy. The Institute consists, basically, of the Director and the Secretariat, 15–20 people located in Southern France, plus the project team people who are working there on an *ad hoc* basis.

REFLECTIONS ON FITCE

Below are some reflections on what these developments should mean for FITCE. These are just reflections at the moment. There has been some discussion in the Comité de Direction, which is the FITCE Board, on the basis of a preliminary report prepared by a reflection group, but this is not final, and is just for discussion at the first General Assembly to come, in Lisbon.

The first reflection was that, also for FITCE, we should create a more equal membership for the different groups or categories. Increasingly, members from industry are showing an interest in FITCE, but still only the PTT members have a vote and they pay a smaller fee. The opinion in the Board is that we should try to find a more equal solution for this, although, for the time being, we have to retain the concept of one national association in each country in charge of FITCE affairs. Without that FITCE would have great difficulty in operating.

The second reflection was should FITCE stay, or not, on the basis of engineers, university graduate engineers? Another association FEFAS—Fédération Européenne des Fonctionnaires Adminitratifs Supérieurs (European Federation of Higher Level Administrative Staff)—exists, which is a similar association but directed to people who are in charge of social, economic, and financial kinds of jobs. In a time when integration is one of the main mottos, integration could be considered, but the opinion in the Board is that this is not really a useful solution. It is much better for everybody if we keep a separate group for engineers. Engineers then should be the basis for FITCE. We think that the university degree should be maintained as a requirement to become a member, although the interpretation of what exactly a university degree is in a particular country is up to the national association. It is very difficult to define a uniform harmonised European engineer, although maybe for the people in Brussels this is one of their interesting tasks for the future; at the moment, we still have to live on the national situations.

The third point is that the national associations should also be, in the future, the nuclei, the focal points, for FITCE activities in different countries. The Board of FITCE was very pleased with the British initiative to have regional FITCE meetings in the UK to which speakers from other countries or other associations are invited. This is also something which could bring FITCE forward.

The last point is whether in the future FITCE should be kept on the basis of the European Community. This is another difficult one but the general opinion at the moment is that we should stay, on the one hand, on the basis of the European Community—it has always served FITCE well—but on the other hand, we should try and open, in some way, the FITCE activities to telecommunication engineers from other European countries which are not members of the European Community at the moment. Inevitably, the word 'glasnost' was also used for this; there is a possibility in the statute for an associated membership which in practice is only a formal distinction from the effective membership you and I have. This could be a solution for those countries which were interested in joining FITCE; for example Austria and several others.

SUMMARY

It is clear that for telecommunications engineers for, say, the 1990s there is an enormous challenge. There are enormous developments ahead which have to be coped with, and telecommunications engineers have a key role in handling this. On top of that, FITCE could support engineers in that role.

Open Network Provision: Concept in Europe

C. CARRELLI†

This article gives an overview of the Open Network Provision (ONP) concept developed within the European Community. It stresses the fundamental role of telecommunications regulation for the promotion and the development of telecommunications services. The activities undertaken by the GAP (analysis and forecasting group within the EEC) on ONP are presented, together with its current program of work. Similarities and differences of the ONP concept with the corresponding concept of Open Network Architecture (ONA) in the USA are also discussed.

INTRODUCTION

The technology evolution during the last decade has certainly been one of the most determinant driving factors for the development of telecommunications and computer industries.

The technical results achieved so far in both sectors have given rise to unforeseen opportunities, and the technology push, supported by a world-wide wish for innovation, has, in some cases, even surpassed the user market demand.

Such a strong stimulus has created the most attractive environment for the development of new services and quite well known is the struggling synergy among the three major players of the game: telecommunications operators and manufacturers, computer industries and terminal industries.

The expanding market of new services ('enhanced' according to the current USA terminology, or 'value added' as they are commonly known in Europe) has attracted a great number of new players and the need to set up a 'fair competition' in the new situation is felt as one of the key factors for the overall success of the telecommunications services development.

In such a scenario, more and more significant is the role of telecommunications regulation, which happens to be extremely complex due to the strong integration of computers and terminals with the telecommunications systems.

Telecommunications regulation will certainly dominate the world scene for the next years and its focus may even surpass the fascinating achievements of the emerging new technologies.

BACKGROUND

The regulatory policy concerning the provision of telecommunication services and the integration of computers with telecommunications systems has normally been carried out on a national basis.

In spite of the various international, or even world-wide, committees active in the development of technical standards, regulatory matters have been developed by national authorities with weak, or even no, relationship at all with foreign countries.

As a result of this situation and with a little bit of fantasy, the telecommunications regulation may be imagined as a 'continuum', with monopoly at one end and full liberalisation at the other extreme. The single national positions may be seen as individual points laying along this continuum, and may move in one direction or in the other according to their own evolution.

Needless to say that any telecommunications regulation, even if more complex, due to the growing complexity of modern networks, and regardless of its real position on the above mentioned continuum, is basically aimed to achieve the same goals; that is, to provide universal essential services at reasonable rates; foster innovation, particularly in advanced information services; and prevent dominant operators from abusing their position.

In line with these basic aims are all the recent innovations in telecommunications regulation among which most significant examples, to cover the world-wide scenario, may be taken from the USA, some European countries and Japan. Similar approaches are in different stages of definition in many other countries and the trend to 're-regulation' seems to dominate the scene all over the telecommunications world.

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The European Economic Community has been very sensitive to such problems and, since 1984, numerous have been the initiatives undertaken in order to promote and harmonise the development and the Common Market for telecommunications service and terminals.

The effort to achieve a common approach in Europe is highlighted in the well known 'Green Paper', whose various proposed policy positions have recently been endorsed by the Council of Telecommunications Ministers at the end of June 1988.

The general objective of the positions proposed is the development in the Community of a strong telecommunications infrastructure and of efficient services, providing the European user with a broad variety of telecommunications services on the most favourable terms, ensuring coherence of development among Member States, and creating an open competitive environment, taking full account of the dynamic technological evolutions underway.

With reference to the above mentioned 'continuum' model, several alternatives were considered within the EEC in preparing the Green Paper, and both the extreme positions of monopoly on one side and full liberalisation on the other were excluded. The proposed positions foresee the '.. acceptance of continuous provision of special rights for the telecommunications administrations regarding provision and operation of the network infrastructure...', and the '... acceptance of continuous provision of special rights for the telecommunications administrations regarding provision of a limited number of basic services, where exclusive provision is considered essential at this stage for safeguarding public service goals ..'. Moreover, it is also proposed to allow '..free provision of all other services... subject to conditions for use of the network infrastructure to be defined..'. And the definition of these 'conditions for use of the network' is the real heart of Open Network Provision (ONP).

In other words, ONP is the key factor to promote and harmonise the provision of telecommunications services in Europe.

The study and the development of the ONP concept was assigned to GAP (Analysis and Forecasting Group) of the EEC at the beginning of 1987, and it is interesting to note that, at the same time, the international press was starting to publish the basic ideas on the Open Network Architecture (ONA) concept, under development in the United States.

THE USA ENVIRONMENT: THE RISE OF ONA

In order to better understand the ONP concept, it is worthwhile to analyse the parallel concept of ONA and how it arose in the USA environment.

The term *Open Network Architecture* was adopted by the Federal Communication Commission (FCC) in its Computer Inquiry III (May 1986), to attempt to effect a regulatory goal of total free market competition in telecommunications and information services.

The aim was to remove the constraints imposed by the Computer Inquiry II (1980) which classified the services in basic and enhanced, and prevented the telephone operating companies offering enhanced services unless they had set up a separate company. This regime, commonly known as *structural separation*, was subject to continual criticism already in the early-1980s and the need for a new regime was strongly felt, particularly following the AT&T divestiture in 1984.

So the starting conditions saw the operating companies restricted to the offering of basic services and forced to form joint ventures or subsidiaries if they wanted to enter the enhanced services market.

But restrictions could have been lifted and the ONA is the means to achieve such a target. The operating companies would have been free to offer enhanced services if they had clearly indicated which were the basic 'building blocks' (basic service elements (BSEs)) necessary for such purposes, and they had made them available, on demand, to any external service provider who may have wished to compete in the offering of the same services. Moreover, such elements should have been offered in an unbundled way and at the same cost which should have been accounted also when they were used internally.

The final goal was then to remove the structural separation, replacing it with non-structural safeguards, guaranteeing 'equal access' and 'unbundling' of basic service elements.

The ONA approach can then be seen as a stimulus for the network operators to enter new opportunities, giving them the chance to expand their market. According to such approach each of the Bell operating companies, as well as AT&T, is encouraged to develop individually a plan to provide access to unbundled network features in a manner that prevents discrimination and promotes efficiency.

Such activities are well in progress within the USA and several ONA plans have already been filed by the different operators.

FROM ONA TO ONP

The ONP concept within the Community has been developed on the basis of very different initial conditions. Telecommunications administrations (telecommunications administrations is the term used throughout this paper to mean any telecommunications operator providing public services with special rights and duties) in Europe have practically no limits or constraints on their offerings, and are free to enter any market, even that of the most sophisticated value-added services, with no regulatory restrictions.

As a consequence, the development of an ONP concept is no more perceived as a stimulus for the telecommunications administrations for the expansion of their market, like the ONA approach, but rather as a means to avoid the establishment of a dominant position and to promote fair competition in the market of non-reserved services. Private services operators will be given access to public networks under defined terms and conditions, and will be able to offer their services in competition with the telecommunications administrations.

ONP is then intended to maximise the utilisation of the public network and to stimulate new market opportunities in the range of non-reserved services.

It is recognised that non-reserved services are built on top of the basic offerings of the telecommunications administrations and that private services operators can offer all services other than those which are reserved.

According to this approach, ONP currently aims at the definition of common interface arrangements on top of the presently available offerings, which may allow private services operators to build up their own non-reserved services and to offer them in competition with telecommunications administrations.

This is the essential point of the ONP concept. The 'openness' of the network does not mean just access to the 'physical network', but rather access, by means of defined interfaces and conditions, to services which are offered by telecommunications administrations, who continue to be responsible for the network infrastructure as a whole and for the provision of universal reserved services.

At present, the basic interfaces to telecommunications administrations offerings may be identified as follows:

- interfaces to non-switched transport services (that is, virtual or physical point-to-point connections, including leased lines);
- interfaces to a range of switched services.

Figure 1 shows the current basic offerings by the telecommunications administrations.

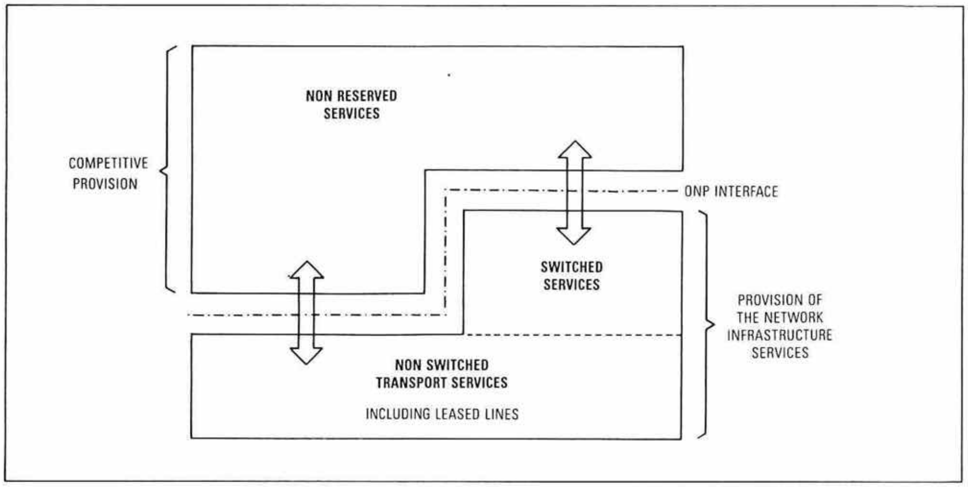

Figure 1
Basic telecommunications administrations offerings and the ONP interfaces

With such a model, it is recognised that telecommunications administrations may gradually extend their offerings under ONP, on the basis of technological progress, telecommunications regulatory evolution, market demand and technical, operational and commercial viability.

Open Network Provision is seen as a natural evolution of the current offerings and could be additional to the existing offerings which may remain unchanged. Moreover, given the situation that network infrastructures differ in the Member States, that there are at present different reserved services in the Member States and that the evolution of the networks will not be uniform over time, ONP implementation should take this into account and should allow a certain degree of flexibility in its introduction in the different countries of the community.

ONP AND GAP ACTIVITIES

As already indicated above (under 'Background'), the study for the development of common principles regarding the general conditions for ONP was undertaken within GAP in 1987. As a matter of fact, at the end of 1986, GAP was requested to analyse the ONA concept and subsequently was asked to undertake comparative analysis of European concepts for network provision to users, taking special account of the evolving ISDN and OSI architectures and the requirements of value-added services.

The first results of GAP are presented in a report, approved within the European Community, which has been drafted on the basis of a large number of contributions from a variety of sources including telecommunications administrations, users organisations, telecommunications manufacturers, EEC documents, and USA telecommunications operators. The report has already had a wide distribution within the Community and has largely been commented in several hearings.

Open network offerings, as presented in the GAP report, can be defined in terms of three basic parameters:

- technical interfaces;
- usage conditions;
- tariff principles.

These parameters, which are normally referred to as the *ONP trilogy*, will typically be strongly interlinked and may differ from the equivalent conditions for existing offerings. In some cases, existing technical interfaces will be adopted, having different usage conditions and tariff principles.

A second document produced by GAP, in January 1989, contains proposals for the application of ONP to leased lines. This document has already been officially published by the Commission and has just concluded its three months period for public comments.

THE ONP TRILOGY

The general approach to specify criteria and attributes for Europe-wide technical interfaces, usage conditions and tariff principles has been the major task for GAP in its first phase of study. Such criteria and attributes, which are normally referred to as the reference framework for ONP, can be applied to several offerings, and it has been agreed to give first priority to the areas of leased lines, packet switched public data networks and ISDN.

Technical interfaces will be based where possible on existing international standards. When they are not available, the European Telecommunications Standardisation Institution (ETSI) will be given the task to develop them.

With the introduction of ISDN, private service operators will be able to access via standardised interfaces many enhanced network features which should provide a good opportunity to build up and develop new services.

Access to ISDN will be determined at the S/T reference points defined in the framework of the CCITT I-Series Recommendations.

The CCITT Signalling System No. 7 is intended to be an essential requirement for the development of ISDN and is considered as part of the network infrastructure and not as an access to network resources.

Nevertheless, it will be appropriate to investigate whether it is necessary to provide, in addition to the standard access referred to above, the means for accessing special network capabilities on an ONP basis. If use of basic and primary rate accesses is found to be impractical a number of these capabilities could be accessed through new interfaces, which are indicated in the I-Series Recommendations as the M and P interfaces (Recommendation I.310).

Supply conditions describe how users can make use of the services provided (that is, whether such services are for own use, for third party use, for resale capacity, or for the building up and the provision of non-reserved services).

The relevance of such conditions lays on the fact that the basic assumption for ONP is that users will not just be final users, but also value-added services providers, who will, in general, be utilising telecommunications facilities to sell their own offerings to end users. Usage restrictions governing such supply conditions are at present fundamentally subject to national regulations and require to be harmonised in order to be applied on a Europe-wide basis.

As far as tariffs are concerned, the development of common tariff principles has been recognised to be a major issue in the concept of ONP. These principles could affect the financial viability of telecommunications administrations, as well as the conditions for the development of new valued-added services. In order to gradually progress in this delicate matter, it has been recognised that cost-based pricing of a set of basic services and facilities that will be offered to all users on a non-discriminatory basis should foster the spirit of competition in telecommunications services within the Community. The tariff applied to ONP offerings can depend among others on the usage conditions applied. In particular, an additional charge can be imposed to reflect the additional cost of the telecommunications administrations in the provision of open network offerings.

CONCLUSIONS

The ONP is an extremely complex concept of a technical regulatory nature. It has recently been defined as the linchpin of the European Commission's programme to open up the European telecommunications market.

GAP is working with a very aggressive timetable, and a proposal for ONP to public data networks is expected to be ready and published by October 1989. ONP proposals will then be developed for ISDN.

The introduction of ONP will ensure uniformity in the usage conditions and tariff principles and will permit private services operators to provide their services in a manner that allows free and fair competition between all operators. By this means, ONP could stimulate the development of value-added services throughout the Community and, in particular, the development of pan-European value-added services.

Nevertheless, it should be remembered that ONP is only one of the various positions proposed in the Green paper. Its concept is strictly related to several other points, such as the maintenance of the financial viability of telecommunications administrations in providing reserved services, the need to rebalance present tariffs towards a more cost-oriented basis, the need to avoid cream-skimming in the period while tariffs are being rebalanced, and finally, the need to ensure fair competition between telecommunications administrations and private service operators in the market for non-reserved services.

An efficient and strong correlation among all these conflicting positions is certainly a conditioning factor for the full development of the ONP throughout the Community and should be carefully taken into account for the overall success of the pan-European telecommunications services market.

Technical Aspects of Open Networks

G. P. OLIVER†

This article, firstly, examines the need for an open approach to standards in telecommunications. It goes on to discuss technology trends in the telecommunications field and the issues that need to be considered in the architecture of the future network. One particular architectural approach, the Open Systems Interconnection (OSI) model is discussed, leading on to British Telecom's open network architecture, and, finally, an application based on OSI—office document architecture.

INTRODUCTION

In his paper, Claudio Carrelli* described very clearly the process by which the regulatory arrangements for Open Network Provision in Europe are being derived, starting from the concepts of basic and enhanced services and Open Network Architecture in the United States and adapting those to the European situation. In this paper, I will be addressing some of the technical aspects of the developing concepts of open systems and open network architecture. These technical issues go much further than the regulatory aspects and depend on implementation on a voluntary and co-operative basis to meet the rapidly growing needs of the telecommunications world and the users of information technology.

OPEN STANDARDS

Why do we need standards? Why are we interested in open standards and why do we want an architecture?

Standards are very important in the field of telecommunications. Firstly, we actually need to agree how we are going to communicate with each other in order that we can interpret the communications; for example, we have to agree how voice signals should be coded; we have to agree how documents should be represented. The success in this field is illustrated by the enormous world-wide telecommunications network and the fact that we can happily communicate around the world very rapidly and readily.

Secondly, we are interested in the ability to mix and match products and services. In building our network, we want to obtain the pieces of the network—the equipments, the software, etc.—from different suppliers and yet be sure that they work together. Similarly, in building the international world-wide network, we want to be able to be sure the different national networks can work successfully together. Also, customers want to be able to obtain different types of terminal and yet be sure that they will work with the network. This is the concept of mix and match.

Then, perhaps a point that is sometimes overlooked, standards can provide a very helpful platform for innovation; they are often thought of as being restrictive in what we can do but, in fact, if we have an agreed basis on which we operate, this can be a basis for moving forward and going to the next stage of development.

But the big question about standards in the regulatory context is whether these standards should be enforced through compulsory means or can be left for voluntary adoption. If they are enforced, are they enforced by some government regulation, some national or European laws, or are they enforced through contract? Obviously, a customer is quite entitled to specify in a contract that certain standards will be used in the provision of a service or provision of equipment; that, of course, is a regular feature of the use of standards, but the use of government law is taking it a further step.

Then there is the issue of how do we get our standards, how do we actually sort out which standards we are going to use? In practise, standards are arrived at in a number of ways. Some standards are proprietary: the company develops a successful product that is adopted and copied by others and becomes a proprietary standard. Then there are industry standards where a collection of companies may work together because they see the need to produce a standard to which they all work in order to create a market-place for something new—an audio compact disc is an example of that sort of standard. And then there are the more regular formal methods of consensus forming through national and regional standards institutes—in particular now the European Telecommunications Standards Institute—and the well-established international bodies, the CCITT and ISO.

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* CARRELLI, C. Open Network Provision: Concept in Europe. *Supp. to Br. Telecommun. Eng.*, Vol. 8, Jul. 1989 (this issue).

Why do we need an open approach? There are a variety of reasons. Network operators need an open approach, they have to keep their networks running and constantly providing service, and, at the same time, they have to be adding new equipment to extend and enhance their services network using the latest designs of equipment. Suppliers need to have the standards since they want to be able to supply to a wide market and to a number of different customers. Service providers need to have some understanding of the standards in order that they can add value around the basic infrastructure; so the standards have to be clearly documented and open. Users need open standards because they want to see widespread availability of the network capability; they want to be able to exploit the latest services but not just to do so in one small territory but to do so internationally.

TECHNOLOGY TRENDS

The established key technologies now are very heavily based on digital techniques: digital processor control; digital transmission; digital common-channel signalling; digital switching—all now well established as the normal means of providing telecommunications networks, and, of course, BT is in the forefront of successfully applying these in the network. Consider now three particular areas of technical evolution:

- *Digital Access to the Network* Already we have digital access over copper pair and coaxial cables and increasingly we will be providing them over optical fibre. Digital cellular radio is also a very interesting development.
- *Network Intelligence* We are increasingly adding to the control systems in our network, taking advantage of what we can do with processor control in order to improve the management of our network and in order to improve the range of services we provide. So network intelligence is a major theme that is being studied, developed and applied in our networks.
- *Multi-rate Switching and Transmission* A third area of interest is that of broadband and multi-rate switching and transmission. What do we do beyond the 64 kbit/s basic rate that is now used extensively in the digital network? What do we do about broadband. What do we do about providing fast packet services? What will the market need be? What is the technology that we can use to meet this need?

The major European research and development programme called *RACE* (Research and Development in Advanced Communications Technologies in Europe) is addressing many of the questions in these areas (Figure 1).

In this programme, there is a strong emphasis on broadband communications and the necessary switching units. Project teams are studying the techniques to provide up to 140 Mbit/s channels on request to customers. There is increasing interest in the fact that people will want to send at variable rates, sending occasional bursts of information at very high speed. Hence the concepts of multi-rate and variable bit rate switching are being very seriously investigated in the switching area.

Network management is an important issue. How do we get all the components of the network to work together and enable the operator to control this and provide services very rapidly, change the pattern of the network, monitor the flow of traffic and so on? Network management is a key area of study involving a great deal of software skills, the use of artificial-intelligence techniques and other exciting possibilities.

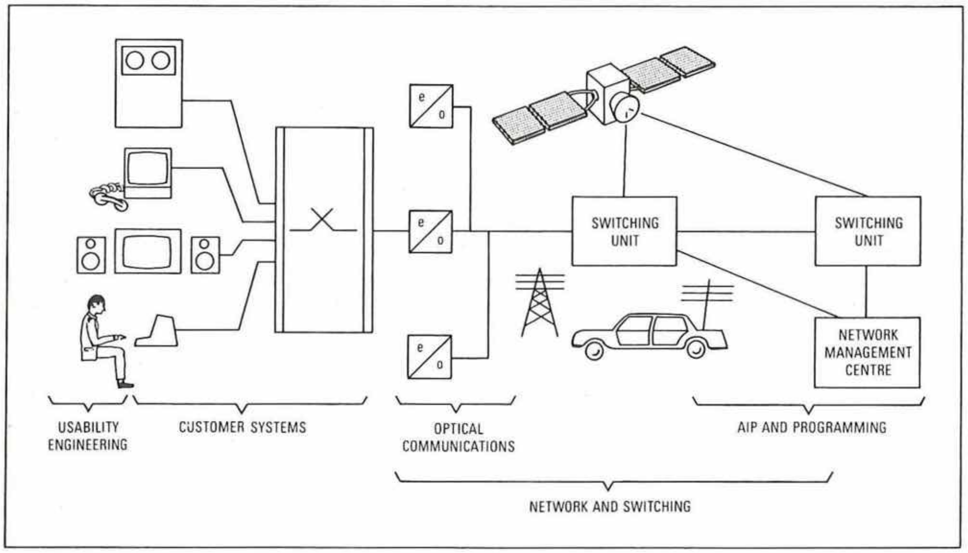


Figure 1
Network 2000: The vision of RACE

Other important aspects being addressed by RACE projects include the use of satellites, mobile cellular radio, optical communications and the provision of networks on customer premises. Out of these projects will come many of the ideas and concepts that will provide the basis for the standards that will be increasingly used in the 1990s and beyond.

ARCHITECTURE

In developing all these new technologies, one has to address the issue of the architecture of the network:

- *System Functionality* What services should be provided; how will we distribute the functions around the components of the system?
- *User Access* What should the actual specification of the interface between the customer equipment and the network be?
- *Usability Engineering* What will the flow of information between the customer and the network be as he or she controls calls and communications?
- *Structural Framework* What are the boundaries between operators, between countries; what are the system and sub-system boundaries within the network?

All of these are the sort of issues that have to be addressed by these studies and be resolved on an international basis through the standards bodies, and to do this an orderly manner, an architectural approach is needed.

The 'layered' approach to network or system architecture is now well know, but it is used to serve different purposes. It becomes confusing when people take one architectural approach which has been devised for a particular purpose and then attempt to use it for another purpose. I have a particular worry when people take what is really a technical architecture and then start to apply it in a regulatory way. Thus an architectural approach is applicable for different purposes: for problem analysis; for specifying a system; for identifying the structure of equipment (the boundaries of the shelves, the racks), and for regulation. But these different applications may require different architectures.

One particular architectural method that has received much attention is, of course, the 7-layer Open Systems Interconnection (OSI) model (Figure 2). This is really a technical approach to the specification of a particular type of system. The danger faced is that the 7-layer OSI model is used for all sorts of purposes for which it was never intended. It is obviously of great interest to extend the application of this model, but one has to be very careful and not to say, for example, that the boundary between the network layer and the transport layer is actually a regulatory boundary because the model was never devised in quite that way, and with that intention.

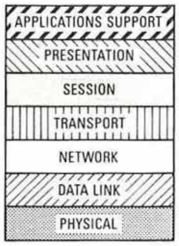


Figure 2—OSI architectural approach

The OSI model is about functional structure and boundaries; it is not about physical boundaries, nor is it about regulatory boundaries.

The aim of the 7-layer OSI functionality is to let different systems communicate. Figure 3 shows three completely different systems made by different suppliers and interconnected by communications links. Provided each of these systems contains OSI functionality, they have a common language which they can use to pass information to each other. That does not mean that they have common software or hardware; it could be implemented in completely different ways, but they have that common language which they understand and can use to communicate.

Applying this to the telecommunications network (Figure 4), firstly users need to communicate with each other and if they are using OSI protocols, then, in their terminal

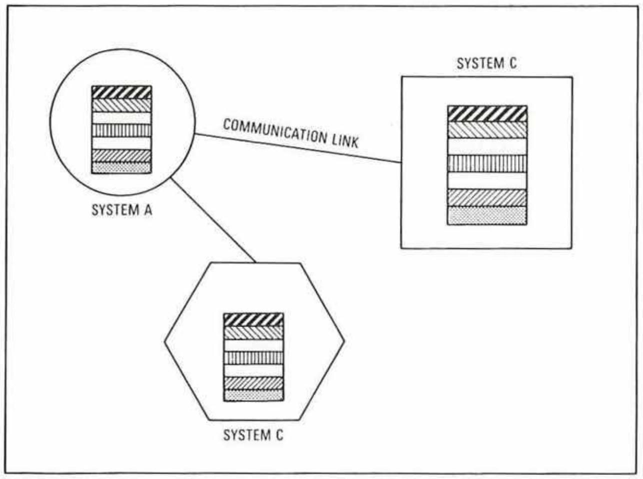


Figure 3—Open Systems Interconnection

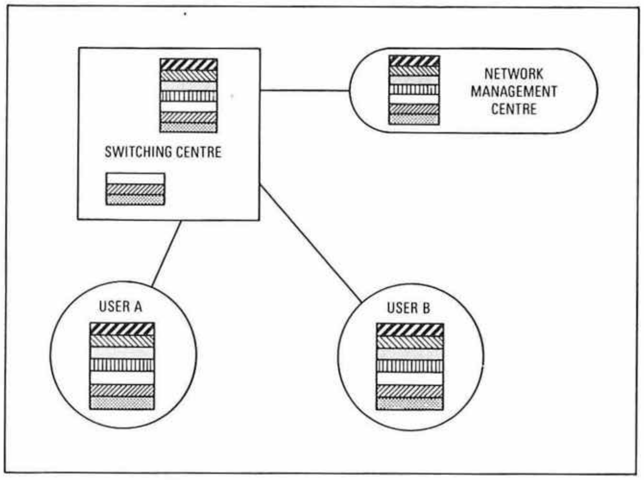


Figure 4—OSI and the public network

systems, they will have this OSI functionality. We also provide some OSI functionality at the switching centre (the lower three levels of the OSI functionality) because in signalling to the network to say what the customer wants, he/she actually uses some of the OSI protocols to communicate with the control system of the network. We have the task of conveying large quantities of data about within our network for the purpose of controlling our network, collecting statistics, etc. The OSI protocol stack is a very useful thing to embed within our network and hence use a standard recognised international means of moving data.

BT OPEN NETWORK ARCHITECTURE

It should be noted that Open Network Provision (ONP) in Europe and Open Network Architecture (ONA) in the USA are about open interconnection and regulation, they are not the same thing as Open Systems Interconnection.

BT's open network architecture is not about regulation; it is about open systems interconnection and it is very firmly based on these OSI standards. But the problem we face with the OSI standards is that they are not complete and they contain options. In turning these into something practical that can be applied for day-to-day use, choices have to be made, some gaps filled, and the scope of the standards has to be extended.

This is illustrated in Figure 5 which shows the 7-layer OSI stack and a path through it, representing a selection at each level in the stack, which is absolutely consistent and which can be used for a particular purpose of communicating; this is known as a *profile*. The OSI standards have to be extended: statements have to be made about addressing, management, security and other aspects. BT ONA is an extending architecture that makes these statements.

At the moment, BT ONA's scope includes message handling service (MHS) and the Gold 400 service is an implementation of X.400 MHS. It is being applied in the X.25 data networks and product area. X.25 is a well-known international standard but it contains options and so one has to specify the particular implementation. There is a local area network portfolio and, perhaps most important of all, there is the network management standards used within our network between the switching centres and the operational centres, the computers which manage the network.

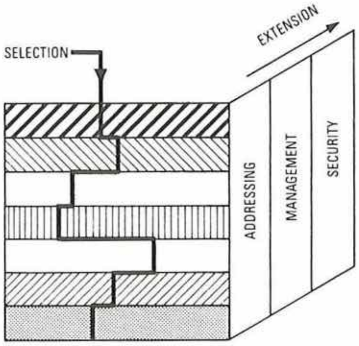


Figure 5—BT ONA

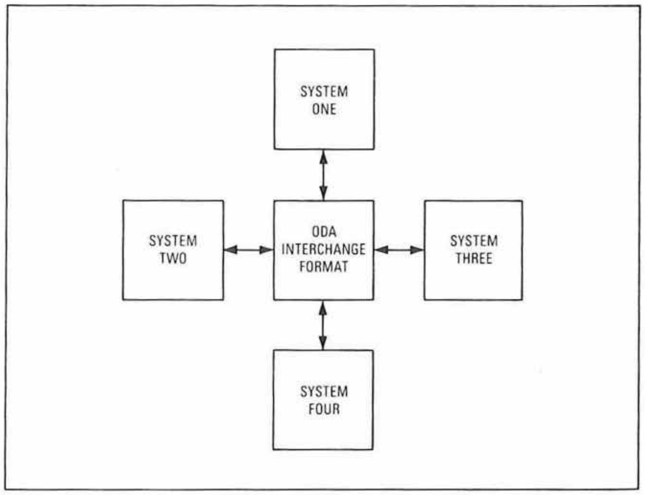
APPLICATIONS

What does one do with this communications protocol? OSI addresses the problem of communication between one system and another, office document architecture (ODA) is an example of a set of standards which addresses the issue of how to represent in a common language the form and content of a document. People want to exchange word processed documents between their systems; they want to exchange them so that a different system can pick up a document, add to it, process it, pass it on to somebody else and it is intelligible at all stages of that process. Thus OSI provides interconnection between systems and then ODA makes the communications meaningful: it says what the communication is all about, for the specific case of documents.

If, for example, you are dealing with a firm that is involved with buying and selling things, all sorts of types of information flow in and out of your firm: purchase enquiries, stock lists, technical specifications, contracts, sales offers, promotional material, invoices. If you want to automate that process, you need to have some way of representing all these documents in a form that your systems understand, and that your customers and your suppliers also understand, in an automated way. ODA provides an interchange format for dissimilar systems to use (Figure 6). The ODA standard sets a means of describing the structure, the style and the actual text or pictures that are contained within the document. It provides a statement of how all that information is represented in a standard way so that it can be moved to some other system and readily interpreted and used by a different system.

By having these various layers of protocols one can build up from the basic communication link at the bottom to the particular function of the customer at the top. Figure 7 illustrates one particular value-added stack that is possible based on the simple communications link. Above it, the X.25 data network enables a variety of applications to be served and these two lower parts of the stack form an important telecommunications 'platform' which is being addressed by ONP. On top of the X.25 data network is the message handling service; on top of that the ODA—other applications such as trade data interchange are also being

Figure 6
Document interchange using ODA



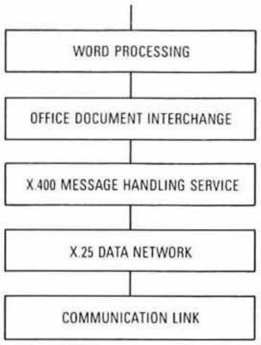


Figure 7—The value-added stack

devised. On top of these we have the actual functions that the company wishes to perform. It is this kind of stack that is really going to meet user needs and the telecommunications areas at the bottom are just part of a chain of activities.

USER NEEDS

What do customers need from the new systems? Firstly, customers are interested in value for money and, of course, improved technology implies to customers that they will get better value for less money. Secondly, customers want better and more services; flexibility, speed, reliability, and added functionality. Also, customers want rapid provision and widespread international availability. Finally, customers want choice; standards and architecture is a way of enabling customers to get that choice.

CONCLUSION

In conclusion, firstly, the open network approach is desirable provided that the standards can be achieved in a timely way and that what we attempt to do is realistic. The formation of the European Telecommunications Standards Institute is, I believe, a major step forward in trying to achieve that.

Secondly, architecture must be considered as a framework in which we can work, and that enables both competition and evolution. Yet we have to ensure that the realities of the situation are recognised; the fact is, for example, that telephones on the different networks in Europe are different because the networks are different, and the situation cannot be changed overnight. Therefore, all that is done in the standards area has to be from a current base.

Finally, it is most important that regulation is applied with great care. There is a very great danger that too much regulation can stifle progress and innovation, in the same way that too little regulation will just encourage anarchy and prevent us providing the sort of services that customers need.

Open Network Provision: Concepts and Technical Realisation Proposals for the Network of the Deutsche Bundespost Telekom

G. ALTEHAGE[†]

This article reviews the German position regarding Open Network Provision and describes two application proposals: interconnection between ISDN/PSTN and public land mobile networks and access via ISDN to data networks.

INTRODUCTION

This paper is divided into three areas. Firstly, a review of the German position regarding Open Network Provision (ONP) is presented: its objectives, understanding and technical approaches. Then two application areas of the German approach to ONP are described: firstly, interconnection between the PSTN/ISDN and public land mobile networks (PLMNs) and, secondly, packet-switched access from ISDN to private service providers and to the Deutsche Bundespost Telekom data network.

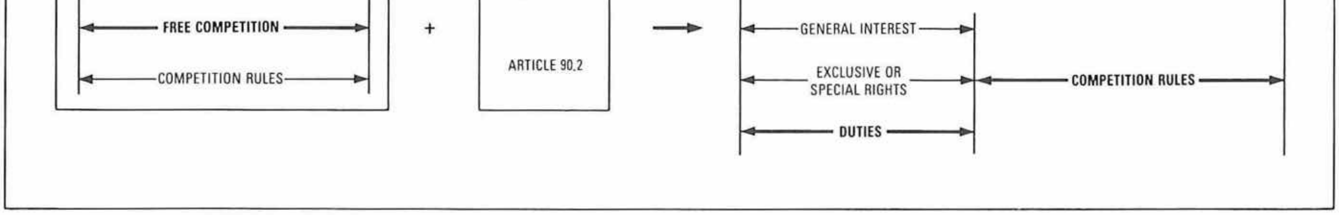
OPEN NETWORK PROVISION

The Open Network Provision envisaged by the European Community is intended to create the possibility of telecommunications services and value-added services being made available by different providers under conditions of genuine competition.

The European approach to the market envisages services provided in an environment of free competition governed by a field of competition rules (see Figure 1). Of particular note is Article 90.1 of the Treaty of Rome which states 'In the case of public undertakings or undertakings to which Member States grant special or exclusive rights, Member States shall neither enact or maintain in force any measure contrary to the rules of this Treaty..'; and Article 90.2, 'Undertakings entrusted with the operation of services of general economic interest .. shall be subject to the rules contained in the Treaty, in particular to the rules of competition, in so far as the application of such rules does not obstruct the performance .. of the particular tasks assigned to them ..'. This leads to the concept of an area of services of general interest provided in the area of exclusive rights governed by duties, alongside a widespread area of free competition controlled by competition rules.

The European Commission 'Green Paper' on the future development of the telecommunications sector envisages continued exclusive or special rights for the provision of a limited number of basic services—it identifies, currently, voice telephony as being the only obvious candidate—and free, unrestricted, provision of all other services. The Council of Ministers, in its Resolution of 30 June 1988, saw the 'definition of technical conditions, usage conditions and tariff principles for Open Network Provision, starting with harmonised conditions for the use of leased lines' as being 'of crucial importance

Figure 1
European approach to the market



[†] Head of Switching Systems for Telephones and ISDN, FTZ, Deutsche Bundespost

and closely linked with the creation of an open common market for non-reserved telecommunications services'. The GAP report sees the ONP as the mechanism to stimulate the development of non-reserved services, provided by telecommunications administration and by private service operators, and to promote fair competition between telecommunications administrations and public service operators in the market of non-reserved services.

The conditions of ONP have to be defined (see Figure 2) in those fields of telecommunications where certain operating agencies have been granted exclusive rights or privileges. This is the principle followed by the new legislation defining the structures of the postal and telecommunications services which envisages liberalised telecommunications services in the Federal Republic of Germany. In the future, the Deutsche Bundespost Telekom will only hold the network monopoly and the monopoly of the telephone service. Figure 3 underlines the relations between network resources and services, indicating the interfaces where ONP apply, from the German point of view.

Thus, to summarise, the German approach and German interpretation of the Green Paper is that transmission and voice telephone service is provided under monopoly, in the field of exclusive rights, and a limited number of basic services in the field of special rights by specially licenced operators—for example, the mobile networks D1, D2 (according to GSM (Groupe Spéciale Mobile) proposals), and satellite communications. In all other services, there is free, unrestricted, provision. From the German point of view, ONP for leased lines and for the access to and from the PSTN have the highest priority. This paper goes on to describe two such interconnection plans: with digital land mobile networks, and access from the ISDN to packet data networks.

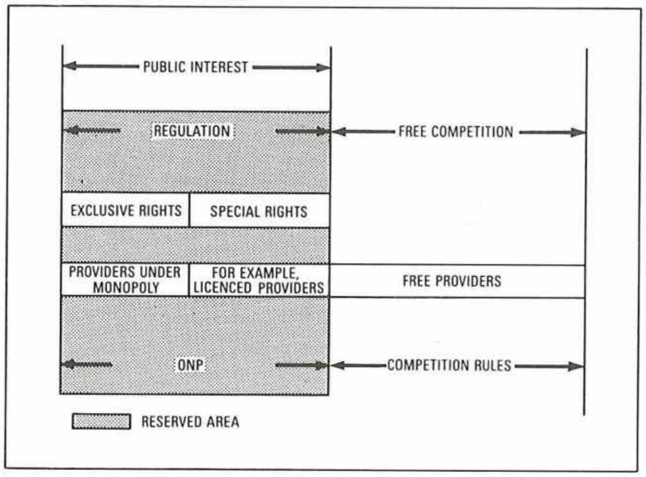


Figure 2—Scope of ONP

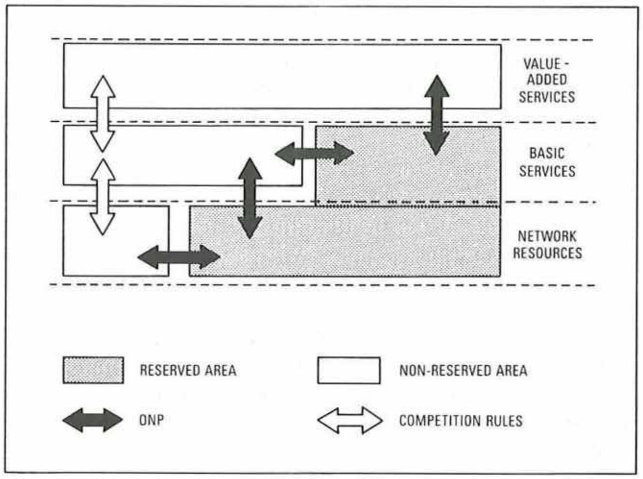


Figure 3—Relations between network resources and services

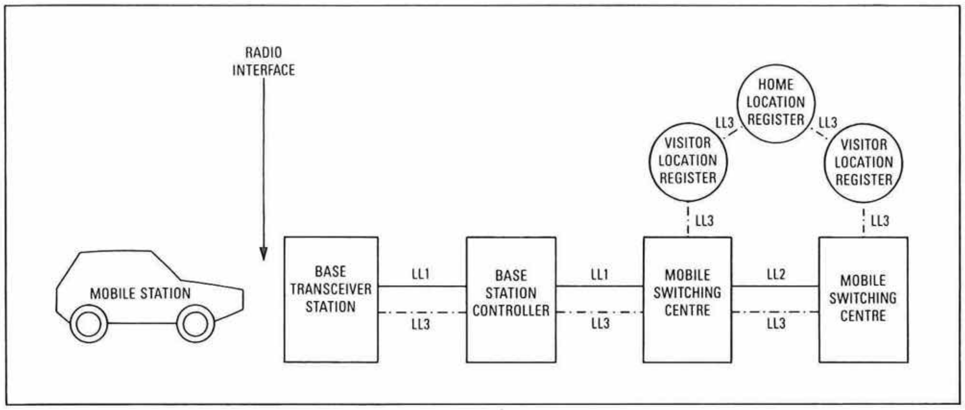
INTERCONNECTION TO PUBLIC LAND MOBILE NETWORKS

The Deutsche Bundespost is currently operating two public land mobile networks (PLMNs): the B network, and the cellular C network. The final capacity of the C network will be below the demand for mobile radio telephones expected for the 1990s. For this reason, the Deutsche Bundespost, in 1990, will start to set up a digital PLMN (D1 network) based on the GSM specifications. This network will allow mobile radio telephones to be used throughout Europe.

The Federal Minister for Posts and Telecommunications will, in addition, issue a license to a non-postal operating agency for the operation of another generally available digital PLMN (D2 network) conforming to the GSM standard in order to ensure effective competition. The frequencies available in the beginning in the 900 MHz range will be evenly distributed among the D1 and D2 operating agencies. A committee nominated by the Minister will define the licence conditions and control both the call for tenders and selection of the licencee among the applicants.

Structure of D Networks

To ensure competition, the postal D1 and the non-postal D2 operating agencies will have to meet identical commercial and technical requirements. In view of this, all the following comments apply in the same way to both D1 and D2 networks.



LL1: Leased line with multiplex of four speech channels per 64 kbit/s
LL2: Leased line for 64 kbit/s speech channel
LL3: Leased line for common-channel signalling links

Figure 4
Functional architecture of the GSM mobile network

The nodes of the mobile radio networks (see Figure 4) are mainly the following:

- base stations, divided into base transceiver stations (BTSs) and base station controllers (BSCs),
- mobile switching centres (MSCs), and
- data banks normally located at the site of an MSC (home location register (HLR), and visitor location register (VLR).

The network nodes belong to the corresponding mobile network operating agency. For interconnecting the nodes, the D-network operating agencies lease from Deutsche Bundespost Telekom the necessary connection lines at the charges specified in the General Terms and Conditions.

Use can be made of 64 kbit/s circuits which, in the case of sufficient traffic values, are routed over complete 2 Mbit/s links. As the charges for the fixed connections have a major impact on the profitability, charges and planning of the mobile networks, both D-network operating agencies will pay particular attention to this matter.

Since the voice signal transmitted via the radio interface is coded at a reduced bit-rate, fourfold use can be made of the leased 64 kbit/s fixed connections between BTS, BSC and MSC with the aid of multiplexers and speech coders employed at the MSC. Since bit rates of 64 kbit/s are switched by the MSC, a multiple use of the connections between the MSC seems to be economically less interesting, although it is certainly feasible if bit-rate adaption and multiplexing are performed before entering and after leaving the MSC.

Network Gateways

The telephone service is reserved by law to Deutsche Bundespost Telekom. The digital radio networks allow data to be transmitted in addition to telephone calls although, in the long run, the telephone service is likely to prevail. As a consequence, subscriber stations directly connected to the D networks are not permitted; that is, no privately owned telecommunications equipment or teminals are allowed to be connected to the MSC via fixed circuits. Hence, all connections between fixed (non-mobile network (PSTN/ISDN)) and mobile subscribers have to be established via the fixed network of Deutsche Bundespost Telekom. For the interconnection of the PSTN/ISDN and the D networks, the Deutsche Bundespost makes available network interconnection lines in the

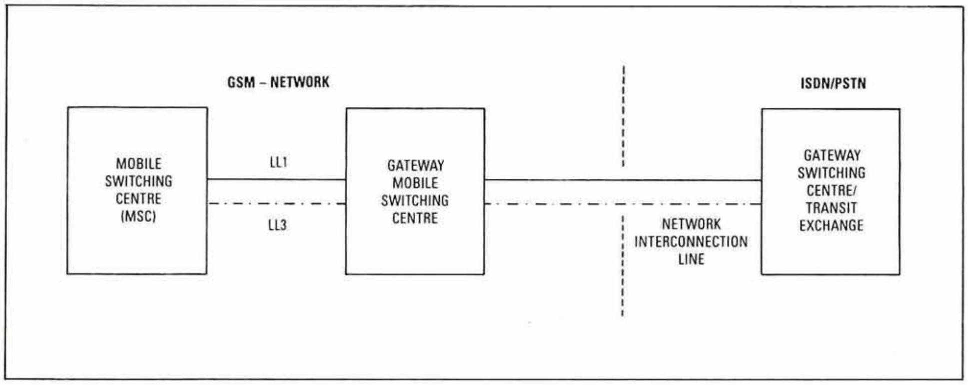

GSM – NETWORK
ISDN/PSTN
MOBILE SWITCHING CENTRE (MSC)
LL1
LL3
GATEWAY MOBILE SWITCHING CENTRE
NETWORK INTERCONNECTION LINE
GATEWAY SWITCHING CENTRE/ TRANSIT EXCHANGE

Figure 5
Interconnection of GSM mobile network and ISDN/PSTN

places desired by the D-network operators. The network interconnection line connects the gateway switching centre (GSC) of the fixed network to an MSC of the mobile network which performs gateway functions and is called the *gateway mobile switching centre* (GMSC) (see Figure 5).

For the network interconnection line, the Deutsche Bundespost will collect charges for providing the equipment and charges depending on usage. The amounts to be charged have not yet been specified. The reference point of the charges for the network interconnection lines lies in the local telephone network where the network interconnection has been applied for. Without additional costs for the D-network operating agencies, the Deutsche Bundespost Telekom connects the network interconnection line to a gateway switching centre of its own choice.

Network Gateway Requirements

The network gateway has to perform the following tasks:

- collection of charging data;
- ensure compatibility with ISDN;
- implementation by 1990 without delay;
- clear delimination of the networks;
- no possibilities of interference between networks; and
- separation of planning activities for fixed and mobile networks.

Call Charging and Account Balancing

Traffic Flowing from Fixed to Mobile Network

The fixed calling subscriber pays a standard call charge no matter where the called mobile subscriber may be. The charge is the total payable for a national call. If a mobile subscriber is on a foreign trip, the latter has to pay the additional cost.

A call between a fixed and a mobile subscriber is set up by means of the joint activities of the agencies operating the fixed and D networks. Therefore, the Deutsche Bundespost Telekom will refund to the D-network agency a certain share of its proceeds, the exact amount of which has not yet been determined.

Traffic Flowing from Mobile to Fixed Network

The call charge is paid by the mobile subscriber. The mobile network operating agency refunds to the fixed network operator the charges specified for the telecommunications network. There are discussions whether or not a lower charge should be payable for traffic outgoing from the D network than for traffic issuing from fixed subscribers. The reason for this suggestion is that calls from the D network are directly transferred to the trunk level of the fixed network, thereby avoiding the fixed network agency's expenditure for establishing the connection between the mobile subscriber via the local network level to the trunk level. Accounting of calls from mobile to the fixed network is particularly important for the Deutsche Bundespost Telekom because both national and international including non-European connections are concerned.

Network Interface

The D network, as defined in the GMS specification, is a digital network. To make full use of both digital routing and the supplementary services, an ISDN-compatible interface had been envisaged from the very start. Hence, it was possible to choose among the following two solutions:

(*a*) interface characterised by 2 Mbit/s signal links each containing 30 user channels carrying 64 kbit/s and by common signalling channels conforming to the CCITT Signalling System No. 7; and

(*b*) ISDN subscriber interface with a primary rate access. It is characterised by 30 user channels (B channels) each carrying 64 kbit/s and one 64 kbit/s D channel.

A decision has been taken in favour of alternative (*a*). This decision was dictated by time pressure since variant (*b*) would have required adjustments in the D-channel protocol. In view of the fact, however that the European D-channel protocol (DSS1) will soon be introduced, adjustment developments for the presently implemented D-channel protocol should be avoided. On the other hand, the DSS1 will not be available in due time for the start of operation of the D channel.

Accounting

The number of calls and the sum of the call durations in both directions are recorded at the GSC. With respect to traffic flowing from fixed to mobile network, it is only necessary to distinguish between the D1 network and D2 network and the tariff periods. On the part of the Deutsche Bundespost Telekom, this direction of traffic flow requires only a supervisory function, whereas at the GMSC it is recorded for accounting purposes. For the fixed-to-mobile direction, the GSC has to record the call data pertaining to two sources and all tariff areas amd tariff periods laid down in the General Terms and Conditions of Telekom. These recordings are the basis for the invoices to be issued to the mobile network operating agencies by Deutsche Bundespost Telekom.

Signalling

CCITT No. 7 is to be used for signalling between GSC and GMSC. Initially, the national version of the message transfer part (MTP) and the ISDN user part (ISUP) based on the Red Book will be used to meet the deadline. In the long run, the use of the Blue Book is envisaged. This is intended to relieve fixed network and mobile operating agencies from the need for detailed mutual agreements and special arragements. Instead, both can rely on an internationally standardised interface.

Signalling Network

The signalling network is the control instrument of a network. It is for protection from mutual interference that, in the interest of all operating agencies of interconnected networks, it is a requirement to have a separation at the physical level, the MTP level and at the user part level.

ISDN ACCESS TO PACKET DATA NETWORKS

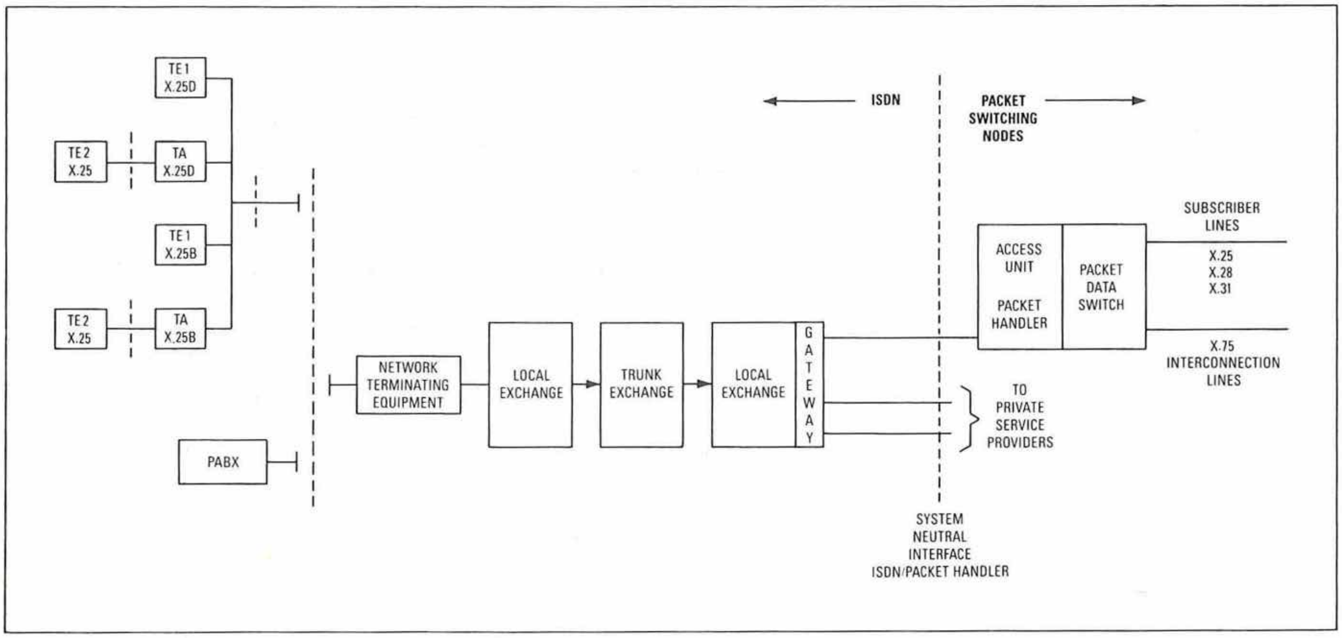
The Deutsche Bundespost has so far liberally made available its telephone network for data applications, telefax, etc. ISDN, put into service early in 1989, creates a large variety of possible applications for private service providers using the subscriber interfaces offered to them.

Moreover, attempts are being made in the sphere of ISDN to find ways amd means of achieving additional improvements in access to the network. These efforts are aimed at making feasible, on the largest possible scale, both the circuit-switched and the packet-switched access to new telecommunications and information services. These possibilities of access are intended to open a way both to the services offered by private providers and those of the Deutsche Bundespost Telekom.

As far as the packet-switched access is concerned, it is both possible to use the D- and B-channel. Since the B-channel access to the packet-switched network has already been implemented (minimum integration), priority is given, at the moment, to the efforts aimed at putting into practice the D-channel solution (maximum integration).

Figure 6 shows the final stage of ONP provision, with system-independent interfaces to a Telekom packet node and to packet nodes of private service providers. ISDN terminals may have access to the B-channel, to the D-channel or to the B- or D-channel, alternatively. For terminals with X.25 interface, a terminal adapter is necessary. Connection of PABX equipment to the ISDN is also possible.

Figure 6
System overview of packet switching access from ISDN



TE: Terminal TA: Terminal adapter

The main objective is to provide a reliable and economic access through the ISDN to the packet handler within the packet data nodes that will probably be implemented in less than only 30 sites in Germany. To avoid overloading the CCITT Signalling System No. 7 signalling links, for packet data transmission, dial-up connections are to be established, from the local ISDN switch via trunk exchanges to the local switch near the packet node; CCITT No. 7 usage is required only for these connections. In the case of D-channel data transmission, about 50 D-channel users can be handled with one B-channel to the packet node. In the local ISDN, a frame handler function has to be provided; in the packet node, a packet handler is needed.

In a first step, a German realisation proposal comprises only the access to the Telekom packet nodes; in a second step, the gateway function for accessing private service providers may be included. The solution needs these ONP-relevant functions in the ISDN switch and the use of the service access point identifier (SAPI).

As far as the standards work for interworking are concerned, a set of requirements for Germany has been prepared; for example, procedures of signalling level 2 and level 3, protocol between terminals and packet handler, a system-neutral interface description for the ISDN—packet node interface, a frame concept for packet switching functions in the ISDN, and a packet switching service description within the ISDN. The requirements and specifications have reached an advanced stage; in the European scene, ETSI/STC NA2 has begun work.

To avoid a special German forerunner solution, and to foster a European version, no final decision for implementation has been made by the Deutsche Bundespost Telekom.

CONCLUSION

The Council Resolutions of 30 June 1988, creating progressively an open common market for telecommunications services and for Open Network Provision, can be seen as ambitious objectives in the process of creating Europe 1992. In Germany, for the general telecommunications policy, competition is the rule, and that is underlined by the new German legislation in this field. This is a reasonable starting point.

But, to provide ONP, not only do technical prerequisites have to be implemented, but also, importantly, sufficient usage and supply conditions and tariff principles. It is worth quoting here the first Recommendation of the Report of the Federal German Government Commission Telecom from 1987: The Deutsche Bundespost Telekom retains the network monopoly as long as leased lines are being provided at appropriate and cost-oriented conditions, complying with the needs of quality and quantity.

Round Table Discussion

The following is an edited version of the round table discussion.

Bill Medcraft (Territory Chief Engineer, London and South East England Territory, BTUK; chairman of the round table discussion): Ladies and gentlemen, welcome to the last session, this round table discussion. I think we have all found the previous presentations an excellent introduction for those of you who have not been introduced to Open Network Provision before and we have a better understanding of the concepts and certainly the issues that are raised by the concepts. Particularly, we realise that it is more than a technical matter; in fact, much of it focuses on regulatory and key issues that we have had experience of in the UK.

It has been particularly useful for me personally because I had involvement with European activities in the late-1970s, early-1980s, but I have lost touch recently. During that time, of course, we in the UK have experienced radical changes and it is interesting to see these practical changes and the effects on the market in the UK and how they relate to these developments in Europe.

We have a very interesting panel of expertise this afternoon. I will introduce the people briefly and then ask each of them to give a short presentation of about 5 minutes to give a little bit more background to their interest in developments and to raise some bullet-points, some issues, that you are welcome to join in. Afterwards we make it, literally, a round table extended out and I ask the audience to participate; it is your unique opportunity to get an understanding of the developments in Open Network Provision.

We have, first of all, Cor Berben, representing the EEC. On the Government representation for the UK we have, first of all, John Metcalfe representing the Department of Trade and Industry (DTI), Telecommunications Branch; and we are very pleased to see Michael Doig of OFTEL, who was not able to be present this morning, and therefore Michael is going to listen to the other 5-minute presentations and has the opportunity at the end of those to add a little. So that is the representation from Government. From BT itself, we have Peter Mackie, Head of EC Relations, BT Headquarters, in the Government Relations Department; he is an expert, of course, in our particular position with Government and an understanding of BT's interest in developments within Europe. Then we have Peter Walker, Director of Planning, British Telecom International (BTI), and, of course, his interest is a very practical one: providing the gateways to Europe and the rest of the world and dealing with all the practical complexities in the practical developments in the UK and the developments occurring in Europe. Finally, with our perception in the UK that the customer is always right, we have a customer with us representing American Express, one of the major customers with particular pan-European interests, Peter Allen.

That is the team, so without more ado I will hand over to Cor Berben from the EEC to give a 5-minute presentation on his position.

Cor Berben (EEC and Vice-President of Group d'Analise et de Prevision (GAP)): I have been asked to say a few words also, besides ONP bullet-points, about the role of the European Community in telecommunications and about the procedures which make ONP plans work, being carried through the different platforms and finally being put into legislation form.

Let me start with the role of the Community in telecommunications. In 1984, the Council of Ministers decided that there be a Task Force Telecommunications and they specified that there should be about five specific roles, one of them being the co-ordination of the development of infrastructures throughout the Community. Another one was a programme of joint development of technologies for future networks, and there you see the RACE programme which has taken off. Another example of such a task was the development of coherent positions of the Community in international platforms. This culminated, in 1987, in the publication of the Green Paper. There are a few aspects of the Green Paper which I would like to highlight because they may take away some confusion.

The Green Paper was the synthesis of the overall situation of telecommunications in Europe and in the world, and it specifically took into account the specific situations in each of the member states. It launched a debate with all the interested parties. It is the only way among 12 countries to get agreed legislation in telecommunications.

At the same time, anything the Green Paper or subsequent documents/recommendations/directives say must be in line with the provisions of the Treaty of Rome, so that gives a very well-defined structure in which our activities take place. With regard to the monopolies, which is a very interesting question, very relevant today, the Treaty says in Article 90 that member states may wish to maintain certain special and exclusive rights. In the UK, you see the example of the duopoly, a typical example of special rights. In other member states, you see the monopolies maintained for the infrastructure and what we have seen in almost all member states is that terminal equipment has been liberalised, value-added services are being liberalised and there is still the special area of data communications.

The results of the Green Paper, in short, are that there is now a mechanism being put up for mutual recognition of terminal equipment type approval resulting in a Community-wide market, separation of the regulatory authority and the operators. In the UK, that is nothing new; in the Netherlands, it happened on 1 January of this year; in Belgium the framework of a law was agreed last week; and, as you heard, in Germany it is going to take place on 1 July. It is a very significant change in the telecommunications environment.

ONP was one of the proposed positions in the Green Paper as well. We are working on it now; we do that together with the member states and we try to build a coherent framework of provision of telecommunication services. A very important aspect in the Green Paper which is not highlighted very much is that this framework does specifically not provide for structural separation. As you know, the regulatory problems in the United States have been addressed by saying to AT&T and the RBOCs, you have special rights in infrastructures; therefore, you cannot offer information services, enhanced services, to the public without structual separation. That is a very particular way of legislating. It is not excluded that it happens in Europe; there are member states who are still discussing the question of whether public operators should be in a position to provide, on an integrated basis by one organisation, basic services as well as value-added services.

Open Network Provision has been created to provide more open access to networks. It should not be a hindrance to competition; it should create an environment where competition can flourish. This requires a certain coherence in the regulatory environment. That is the only way to ensure effective opening of markets. At the same time, we realise that imposition on operators to provide is far reaching and should be handled with care. In certain cases, one can refer to formulations like 'carry also' or to 'if you offer a certain service, you must adhere to a European standard'; it is not always a mandatory provision as such.

An interesting question which may be raised later is the issue of ONP offerings and, besides that, non-ONP offerings. That is a very complicated one but I will explain it briefly. We have said from the start in the analysis of the area that existing offerings should not be tampered with. What is happening today should be able to function and should not be hindered by ONP. Then there are a number of offerings for which harmonisation is vital and I will give you an example in the area of leased lines. The GAP group in its analysis has proposed four types of leased lines which are essential for European-wide availability, and the standards have been identified and ETSI will be asked to fill in the details of these standards. There will be many other types of leased lines, and the question then is do ONP conditions apply? Because I said that the Treaty will always apply, there are a number of ONP conditions which apply equally to ONP technically-defined lines and other leased lines because, otherwise, you would get the situation that somebody says 'Oh, but my 8 Mbit/s leased line is not one of the four so I can do whatever I like.' The ONP conditions which are derived from the Treaty and which apply in all situations can be characterised briefly: offerings must be based on objective criteria, and that means there must not be unfair pricing practices; there must be transparency and there must be proper publication of interfaces, not only of the ONP leased lines but of all the offerings of a public organisation, and finally, one which seems quite evident, equality of access for all users or non-discrimination of users. It is evident that if you look at the prospect of fair competition between the owner of the infrastructure and the competing value-added service providers, it becomes a very interesting question. Equality of access in practice means that if the Deutsche Bundespost, to take an example, offers a certain access from its fixed network to one mobile operator, let us say at a certain technical standard, it will be a requirement that the other operators receive a comparable or an equal access. These type of conditions will apply in the whole area.

Another interesting question is: does ONP only apply to providers or does it also apply to private service operators? With respect to that, the core is that the connection links, as characterised by Graham Oliver in his speech, are typically from the provision side and there will be certain supply conditions. On the user side, it is different. One cannot say to the user there are no impositions at all; there are no provision impositions, but there are usage conditions to be followed, as you have seen in the trilogy of Mr. Carrelli. Now such usage conditions, how should they be envisaged? At the European level we would say, and that is in line with what you see in the requirements for terminals, there must be a minimum number of conditions fulfilled. I will give you an example, we call them essential requirements. The integrity of the network must be ensured, so users cannot use what they have been offered by telecommunications administrations in a way which endangers the operation of the network; there will have to be a certain respect of data protection and user privacy; there can be an interoperability requirement in justified cases, something which has led to very intensive discussions with, for example, certain organisations who feel interoperability is something they can allow on a voluntary basic. To give an example, the VADS Licence in the UK contains certain possibilities of interoperability requirements. It does not mean that they are automatically applied, but if they do not adhere to the essential requirements, it would mean that a country like the UK could not maintain such conditions on users of the network. From the European point of view, we say that, if you apply conditions to users, they must be limited to those which are essential to the functioning of the network as a whole, they cannot be arbitrary.

I think I have raised certainly one interesting bullet-point there and I would like to finish by saying a few words about how ONP is being created. Each action in the Community involves at least three institutions: the Council, which decides; the Parliament, which expresses an opinion and amends; and the Commission, which has the initiative to make proposals. These proposals are being prepared with the help of member states through advisory committees like the SOGT—the Senior Officials Group—which then has again the GAP group to prepare certain analyses in the field. These reports, once they have been properly printed, are announced in the official journal and anybody who wishes to comment on them can make use of that public consultation.

Subsequently, analysing the comments from the users, from the industry, from the telecommunication administrations, the Commission prepares a proposal, that proposal goes to the Council, the Council sends it to the Parliament; the Parliament in the co-operation procedure has quite an influence on such proposals. It goes back to the Council of Ministers for final adoption and then it is implemented in the member states.

Now in the case of ONP, the framework directive, which sets the overall framework, the scope of application and the procedures to be followed, is in quite an advanced stage. The Parliament has discussed it from February to April in committees, in May the plenary session of the Parliament voted on the ONP proposal, they made 18 amendments and they passed the proposal of the Commission. Subsequently, the Council of Ministers will look at it again to come to a common position and then it is to be anticipated that it will be adopted by the Council. That takes quite a bit of time. Subsequently, it is being sent to the member states, which then have the duty to incorporate it in their national legislation. So we are talking about far-reaching implications.

With regard to leased lines, we are now in the phase of public consultation—organisations who are interested to have the report are welcome to address themselves to us and we will send the report. The next area of analysis is public data networks and that is what we are working on now with the member states. From the UK, in these platforms, we typically see DTI, OFTEL, British Telecom, Mercury and user organisations.

***John Metcalfe (DTI Telecommunications Branch)*:** On the subject of ONP, the Government's policy is clearly different from that of many of the member states which consider that they should retain control over more than simply the network. We used to think that we were very much in line with the Commission's proposals as set out in the Green Paper, but it has become apparent that the Green Paper, which Mr. Carrelli earlier described as the Bible, has, in common with the Bible, the possibility of different interpretations and one can, and indeed people have, built up great theologies on holy writ. I am not going to attempt to do that today but I just make the point that we probably now feel that we have a rather different emphasis towards this area from the emphasis which the Commission appears to be putting upon it. If anything, our view goes very much along with that which has been expressed as the German position.

Broadly speaking, government policy is as we understood the Green Paper to be. The UK has a very strong interest in the liberalisation of telecommunications and this has two simple reasons. One is that the economic theory, and indeed the empirical evidence from our own experience since 1984, seems to show that liberalisation works; it leads to the growth of markets and to increased welfare for users and for service providers and, last but by no means least in this company, the network operators. The second is perhaps a cupboard-love reason; it is that we have in the United Kingdom a very strong services sector which has built itself up since we liberalised and we believe that our service operators should have an opportunity to compete in Europe in the same way as European and third-country operators are able to compete in the United Kingdom—we think that is only fair.

For these reasons, the Government fully supported the aims of the directive which we have heard about, and which we understand the Commission has in contemplation, to use its own powers to remove from the PTTs of Europe their monopoly in the supply of services other than voice telephony.

ONP comes in because the striking down of monopolies is not enough; there needs also to be arrangements or agreements on technical interfaces, which we have heard about, and usage conditions and service conditions and, perhaps, some aspects of tariffing if the potential for competition is to become a reality. But the Government sees no need at all—and Ministers have endorsed this view—for ONP rules to apply outside the so-called reserved area, that is, the fixed link network, and it is believed that it should apply only in respect of network operators. Any further regulation or harmonisation or equalisation, whether up or down, would, in the Government's view, simply stultify the competition which we are trying to engender and which we believe it is in Europe's interests to engender, and would frustrate innovation and perhaps even force the United Kingdom to reverse its own policy of liberalisation. Ministers regard that as something which we must resist as hard as ever we can.

***Peter Mackie (BTHQ Government Relations)*:** I have responsibility within Government Relations Department for relations with the European Community and that is a comparatively new post which reflects the increasing importance of regulation on a European scale. We are not just faced with regulation by the UK Government, DTI and OFTEL, but regulation coming from Europe, and the two approaches do not always coincide as you will already have gathered from the comments from Cor Berben and John Metcalfe. My customers, to use the TQM expression, are OFTEL and DTI in the UK, the European Commission in Brussels and the European Parliament moving between Strasbourg, Brussels and Luxemburg, and those customers reflect the way that European legislation is formulated which involves those different parties either in making proposals, producing directives or being consulted in one way or another. I attended the GAP meetings on ONP and leased lines under Mr. Carrelli's chairmanship, which was my introduction to ONP, and I attend the Senior Officials Group on Telecommunications as the BT representative as part of the UK delegation.

I think there has been a tendancy not to take European initiatives seriously in the past. I thinks this probably stems from CEPT origins, with recommendations which were merely recommendations, and we are now talking about a completely different 'ball game'. We are talking now about directives which are mandatory, which are introduced in national legislation, and therefore we do need to take issues and initiatives coming from the Community much more seriously than perhaps we did before.

Looking at ONP in particular, it raises quite a number of questions. Its basic aims of promoting value-added services and ensuring fair competition is something which I think we can all support; the proposals in this respect are no different at all really from the regime which has existed in the UK since 1981 and 1984. The way it is done, of course, raises perhaps some difficult questions: the extent to which details should be mandatory or voluntary and, in this respect, I think BT does not always agree with the Commission, does not always agree with DTI and that does not always agree with users either, but I think that is a fairly healthy position, and, of course, we do agree sometimes with all of them.

John has mentioned the question of the scope of ONP: should it apply to competitive services? That is a key question and you will see there is a different view between the Commission and the DTI on that. Of course, packet switching in the UK is competitive, it is non-reserved to use the European Community terminology. That is also the case from 1 July in West Germany. It is not the case elsewhere in Europe, at present, although there is a controversial directive on the stocks at present which would make it so. Therefore, for some time, the UK position has been taken from a different competitive situation in that respect. If the directive which the Commission has on the stocks would liberalise basic data services, then other countries in Europe would be in a similar position to the UK; so we may see some change of views if that in fact happens.

Only one further aspect that I would like to mention at this stage and that is that ONP will most certainly effect the way we provide our services. As Cor Berben mentioned, there are four mandatory leased lines which the ONP work on leased lines has produced. I do think the stands in that respect, as was mentioned this morning, are fairly well developed; that is not the case with other areas which will be looked at in due course. And so, I think, the message which I would really give is that ONP is a very important initiative, it is one that we need to take seriously, it is one which will influence to a large extent how we provide services in the future, and we need to take part in the debate on the topic within Europe. I think the sort of forum today which brings the topic to a wider audience is a very important initiative on behalf of IBTE and FITCE.

***Peter Walker (Director Planning, British Telecom International (BTI))*:** Let me say a few words about the world of the international operator and how I see ONP and some of the related issues.

We are responsible, for planning, providing and operating the networks and services in and out of the UK. That is the primary role of BTI; there are other roles, of course, but that is our primary one. We therefore act as an interface between the UK and Europe as a whole, but also many other parts of the world, and when I look at ONP, I see a largely regulatory concept which does not go as far as the stage of liberalisation that we are already at. I wonder, therefore, whether BTI will find itself squeezed as it were between the regime that is operating at the moment in the UK and another set of regimes in Europe. How, for example, do you interwork between reserved and non-reserved networks? I wonder if there are problems that could come in that area. I also wonder whether ONP will fulfil its aim of promoting competition and ensuring fair competition or whether the over-standardisation that could occur at some of these technical interfaces that may emerge might end up actually stifling the variance of technical arrangements that many of the competitors would like to supply and many of the users would want as well. I guess, in other respects, ONP could have some similarities to something that we know and understand very well in British Telecom and that is a requirement to connect with others on terms set down by bodies outside us. I refer, of course, to interconnect to the other licensed operators and there are many lessons there that we have learnt over the management of the process of connection to the licensed operators in terms of what ONP might mean for us.

It is interesting looking at the three strands of ONP: the usage conditions, tariff principles and the technical area. I think on the usage side certainly one of the more controversial areas is the harmonisation of some of the usage conditions. I am sure users will be very keen, for example, to see standardised provision times for leased circuits if they feel that means they will get them quicker. This is an area that is fraught with difficulty and, at the international level, there is always the problem that there are two ends to every private circuit and even if you can move fast there is always another partner at the other end. There are very real problems in getting the improvements that we all seek.

On the area of tariff principles, especially for some of the more complicated services, there could be some advantages here on harmonisation, if it assists international one-stop shopping. Maybe you do not appreciate that, but if you wish to lease a circuit between England and France, you have to approach both British Telecom and France Telecom and lease from each a theoretical half-circuit. What we are now trying to move to is the ability to just have one-stop shopping. This is certainly something that a number of the leading international operators are now pushing very hard on and that is to offer our customers the ability to come to just one international operator for their services rather than having to go to two.

Finally, on the technical conditions side, one sees here perhaps a subset of the wider European standards situation that we see in many other areas. The problem with setting standards among countries is often there are differing national views and in order to reach the wonderful consensus that Graham Oliver mentioned this morning we often end up putting options in the specification to safeguard particular national positions of various countries who are not prepared to concede to a single view. It is all very well to allow everybody to operate to the standard and claim they meet the standard, but as an international operator we have a rather different problem in that, in order to operate between countries, you cannot have a range of options. We cannot, literally, operate a service with 50 different flavours to 50 different countries. There has to be some agreement and indeed it was agreement on international interconnect that started the CCITT in the first place. I would certainly hope that ONP as it develops does not have several get-out clauses for particular national areas because that might give us problems at the international level.

Finally, I think, on European standards, I would say that they are often not enough. As a major international operator we are dealing not only with Europe but North America, Japan and the rest of the world. Some of these places too have liberalised or partially-liberalised environments developing their own standards for what can be done and what will be allowed on private circuits or packet data and so on. I think it can be a problem if Europe develops in a way that does not recognise both the need to solve problems within Europe and also between Europe and some of the other major parts of the world. We need to ensure, as ONP develops, that not only do we understand what can be done and should be done between European countries, but what, for example, will be the arrangements between the European regulatory scene and that in North America and that in Japan. There is need for work in that area too.

Peter Allen (Vice Chairman of the International Telecommunications Users Group (INTUG))**:** I am here today to give the view of users of telecommunications services. I shall be presenting a personal view, but it is one formed as the result of many discussions with a large number of users when I have been preparing to present their views on other occasions over the recent years. It is also a view formed from direct experience in my work in the international telecommunications department of my employer, American Express. My employer allows me some time off to take part in general activities on behalf of users—in the Telecommunications Users Association (TUA) in the UK, and in the International Telecommunications Users Group (INTUG) internationally. They do so without directing those activities, but they clearly recognise that whatever improvements result for users in general will also be of direct benefit to the Company.

Although not speaking on behalf of Amercian Express, I can say that we, like most other large business organisations, do not have a big-business-only view of telecommunications. Certainly telecommunications is very important to our internal operations, but we also need to communicate effectively with very large numbers of small enterprises and individuals as well as with our international offices and other large companies. We are thus very concerned about the availability of a widespread telecommunications capability meeting the needs of all users, because we need to communicate with them too. I do not accept the view that what is good for business is bad for others. I have heard, I think, Sir Bryan Carsberg remark that what is good for business can be seen as being good for the country as a whole since business creates the wealth, and provides employment, to the ultimate benefit of all.

For most business organisations, telecommunications is something they do not really want to be involved in. They just want to get on with their main business, be it financial services or selling forestry products. Unfortunately, many of us have needed to become involved in developing private telecommunications networks because in the past we found that the services which were available to us were not quite what we needed, particularly when operating on a world-wide basis. That situation continues today. My company employs 120 telecommunications specialists in Brighton and runs its global telecommunications network from there—including such distant areas as the Asia and Pacific regions. As a source of skilled telecommunications engineers with a sound understanding of international telecommunications, the UK is hard to match. This is very helpful in encouraging international business organisations to establish their European—or even their international—headquarters in Britain; which, incidentally, is one of the duties placed on the Director General of OFTEL by the 1984 British Telecommunications Act.

Users see Open Network Provision as being essentially about regulation of telecommunications. Regulation, users believe, is aimed at protecting their interests—or it should be—and so when such regulation is based on sound and complete information they do not fear it. Regulation may be necessary to control the activities of one or more players in a market and should correct any distortions which result when market forces alone are not able to ensure a healthy competitive environment. The effect of regulations should be to produce the result that would emerge in an open and efficient market. Regulation is a substitute for competition; and where competition can operate the competition is the best regulator of all. This is the general background perspective which business users bring to ONP.

In looking at the proposals for ONP as they are developed, we find they are getting very detailed and spreading into areas where we believe competition can do the job—and is doing the job already in the UK. The three key elements of ONP have been mentioned, the trilogy, consisting of technical interfaces, usage conditions, and tariff principles. A strong concern of users is the statement that they are interlinked. Usage conditions tell users what they are allowed to do with what they are paying for; tariff principles determine the price that they will pay. Does this interlinking then mean we shall pay more for less onerous conditions of use? Prices should only be related to the cost of the service provided, because that is the way that they naturally tend to evolve in a truly competitive market. That should be the result of ONP. Usage conditions which are related to safety, or harm to the technical facilities of the network, or interference with other users are clearly acceptable. But the usage conditions which we face today go very far beyond these aspects and, from the user's perspective, the usage conditions emerging with ONP do not seem to be cut back to the barest minimum. Conditions such as privacy and data protection do not seem to users to be directly related to the way in which we use the ONP facilities provided; such matters are more concerned with the way in which we operate our businesses and should apply even if we make no use of ONP facilities.

As users, we believe that ONP should be established to ensure that there is fair competition. Telecommunications administrations, or PTTs, or PTOs, provide the infrastructure and basic services under special or exclusive rights. In the ONP world these services are reserved services. But everyone can compete in providing all other services (non-reserved services), including the PTTs themselves. Unfortunately, all of those competing with the PTTs in providing non-reserved services will have to use the essential basic telecommunications facilities which are provided to them by the PTT, which is one of their competitors, and probably their main competitor. That is not a comfortable feeling for those competing with PTTs, even if ONP is meant to address the situation.

Almost all business operates in a competitive world, and we like to purchase in a competitive market, but on the other hand we would dearly like to sell in a monopoly or near monopoly market. When selling in a competitive market one gains an edge by reducing one's costs, by becoming efficient. But the same effect can be achieved by raising one's competitor's costs. A serious flaw in ONP is that it appears PTTs will not be required to apply ONP terms and conditions to those parts of their organisations that are providing the PTT's own non-reserved services. Some countries, like the UK, may require that this is done so as to provide the basis for a level playing field; but it seems that the European member states are unlikely to be required to do so by a European Directive on ONP, and so many will probably choose not to do so. Users consider that ONP should simulate the conditions which would be obtained in a truly competitive market, where there is not a very large and dominant supplier with almost total control over a large part of that market.

As I listened to the earlier speakers some thoughts came to my mind. It was said that data communications may become a non-reserved service. Users would welcome that and believe that it should become such a service. If it does, then the application of ONP to it would not be appropriate. Users would welcome in other European countries the same level of choice in the supply of data communication services that we enjoy in UK today. Choice is one of the users' prime demands, even it does carry for us a certain tyranny. Making the choice is always much easier when the options are very limited; but I know of no UK users who wish to go back to the old single supplier days. The idea of British Telecom offering packet switched data services in Germany, and of Transpac offering service in UK is attractive. But PTTs seem more inclined towards co-operation and avoiding competition rather than embracing it.

Peter Walker of BTI spoke about the theoretical half-circuit concept resulting in the need to order international leased circuits at both ends. Certainly users want simplified single-end ordering (and payment), but acceptance of a responsibility for the total international communications capability that they are buying is equally important. I remember in my early days in operating international telecommunications services we defined an international telecommunications circuit as an information channel with an idiot at the other end. An unkind thought, but today all too often we find when establishing new circuits between two countries that each end is reporting to us that it is the other end which is causing the delay. Perhaps if they also reported that to each other the matter would be resolved more quickly—which is the end result we all want. But perhaps it is all just human nature; I noticed flying from Nice last week that the French reported air-traffic problems in London, and in London they were saying that there are air-traffic problems over France.

As users we welcome the concept of ONP. We wish to make a suitable contribution to its development as it can have a significant effect on the way we use telecommunications to compete in Europe and in the rest of the world. But we wonder if all who will be affected by ONP are having a very large and important business in its own right. But if it accounts for 10% of the gross national product of a country, then those producing the other 90% rely on and use telecommunications to produce that 90%. Their views, as users, must be given a suitable weight. In the UK, users have a good hearing; in countries such as Denmark and the Netherlands we do as well; but our user colleagues in other European countries tell us that they have great difficulty in getting their views taken into consideration. This should be a matter of concern to us all as it could distort the whole European market.

Sometimes in the UK, I hear comments about the faceless bureaucrats sitting in the European Commission in Brussels. This is not my experience. You have met and heard Cor Berben, and I have met him and his colleagues many times before. I find the European Commission is always open to informed input from people and organisations and we should all be making that input. By doing so we ensure that sound decisions are arrived at. You may think that organisations such as the Institution of British Telecommunications Engineers could be providing an input as well. Any view expressed by those with relevant experience does have an effect, I can assure you.

Michael Doig (OFTEL, Head of Value Added Data Service Licensing Section): I was not here this morning, as you know. I do not know precisely what the other speakers had to say but I have picked up the drift of the content of their papers from listening to other comments from the members of this panel.

I think it is vitally important to remember that ONP, if you can call it that, began in the United Kingdom a long time ago. In 1982, the United Kingdom Government introduced a licence, known as the *Value Added Network Services Licence*, the VANS general licence, which first permitted private service operators in the United Kingdom to lease capacity from British Telecom and provide value-added services. This was a hugely successful licence; something like 200—I think it was 220 at its peak—private service operators took advantage of this by about 1985. In 1987, this regime was taken a significant step further with the licence called *VADS Class Licence*. If you are wondering what the difference is between VADS and VANS, it has been a source of confusion to a lot of people, but the primary difference is that, within the United Kingdom, the VADS Licence allowed basic data transport services, basic packet switching if you like, to be provided within the United Kingdom by private service operators. It made a significant development at the international level insofar that it allowed UK operators to engage in the provision of value-added services internationally.

At the same time as the VADS Licence was introduced, a number of amendments were made to the licences of the fixed-link PTOs including BT, Mercury and Hull to allow those operators to provide value-added services in an integrated manner. Prior to that the fixed-link PTOs were running their value-added services under the VANS Licence as well, but it was decided that this was inefficient and it was decided at that time to allow British Telecom and the other fixed-link PTOs to provide value-added services using premises which were used for their main systems business.

The VADS Licence is my area, this is what I deal with in OFTEL. I have been living with this regime for over two and a half years now. It is very complicated. I spend a lot of time dealing with issues about interconnection, pricing, OSI and numbering plans and so forth, but my customers include the likes of IBM and ISTEL; I do not deal with BT as such on the value-added side.

I became involved in ONP about 18 months ago. I saw papers coming over to OFTEL on the work of GAP. At that time, it was producing a report for SOGT on the question of Open Network Provision, and that report was responsible for producing this famous trilogy, which I am sure you will have heard about, on technical interfaces, usage and tariffing principles. I became more fully involved a little over a year ago when GAP began its work on leased lines, which I consider to be the most important area of this activity. I attended meetings throughout 1988 and saw the leased line report through. The work on that was completed just before Christmas last year and it was then discussed by SOGT earlier this year; as Mr. Berben has explained, it is now working its way through the various processes.

What does OFTEL think about ONP? My colleague, John Metcalfe has given the UK Government's view on this and OFTEL shares those views. In fact, we have been partly involved in the processes leading up to the formulation of this view. Let me say, firstly, that the United Kingdom certainly supports the European Commission's aim of liberalising the service market, that is undoubted. We would like to see this liberalisation taken as far as possible. We see genuine advantages in allowing competition to develop not only in value-added services, however defined, but to take it a stage further and allow competition to develop in the basic data service market which, just to remind you, was the main change effected by the VADS Class Licence in 1987. We consider it important to allow service providers that freedom because, in the provision of services to customers of a value-added nature, it is the experience in the UK that service providers eventually hit problems: some customers may only require basic data transport; not all the time, but certainly if a private service operator is under an obligation only to provide value-added services, however defined, and that is a moot point, he runs into problems. There are occasions when, for quite genuine reasons, the customer of the service operator requires, simply, basic data transport facilities and that is precisely why we liberalised basic data services in 1987. We think that if competition is to take off in Europe this facility ought to be extended in other countries.

We essentially consider that ONP should be concerned only with access to what is referred to in the Green Paper as reserved service. Reserved services are those services which shall remain within the monopoly domain. We consider that monopoly services should be confined to provision of infrastructure and as regards the value-added service market that primarily concerns the provision of leased lines. We consider that another area which should be reserved is the provision of voice telephony, although this should not be preserved forever in the United Kingdom. We are well advanced with plans to allow private service operators to provide basic voice-telephony services over leased circuits as a result of the new Branch Systems General Licence which will be introduced later this year.

Another concern is to avoid what we consider to be unnecessary re-regulation of private service operators through this ONP mechanism. I must add the point here that it is not our view that the Commission itself has been strongly motivated towards the regulation of these private service operators in that way. They have come under immense pressure from some of the member states, which leads me on to the final point, that unfortunately perhaps this experience of ONP has tended to polarise views within the Community. Every member state has its own individual views but, insofar that you can put a dividing line there, it is possible to say that, on one side there are those member states, including the United Kingdom, Germany, Holland and Denmark, which consider that ONP should be confined to reserved services, minimal regulation of private service operators, that sort of view; the other view shared to varying degrees by the other member states has tended to cause a polarisation and this has led to some quite bitter acrimonious debates at times in these various committees. I am not sure that it is very good for the telecommunications industry but there we are, we have to live with that.

Bill Medcraft then invited comments and questions from the audience.

***Speaker from the audience*:** First of all, could I thank today's speakers for, certainly, clarifying a few points for me on ONP. What we have concentrated on today, of course, is ONP in Europe and standards in Europe. It is perhaps not surprising that I have a similar view to Peter Walker as I work with him. We do operate a global network so there are two kinds of alternative questions which occur to me. One can be summarised as, are we taking down barriers within Europe to build new barriers around Europe? That would be one viewpoint. Another alternative question is, perhaps, are we happy to allow third-party operators from, say, the USA or Japan to take advantage of open networks within Europe? I would be interested in views on those subjects.

***Cor Berben*:** Yes, it is a very interesting question. I think with regard to ONP from the technical side; we have been quite clear, we will adhere to international world-wide standards wherever they are available. ONP is not trying to re-invent the wheel. If there is no international accepted standard, then ETSI will be given the role to develop a standard which is suitable to Europe, but, clearly, in the context of promoting such a standard to a world level, and if that does not succeed, then we will adhere to the accepted world-wide standard.

The second question, about operators from outside of Europe, is a very interesting one; it was raised before the break, when a similar question was asked. Article 59 of the Treaty is quite clear; it says that any citizen, any national of a member state, as well as any company established in the European Community, has the right to provide services. The exception is, of course, that member states can grant certain special or exclusive rights but the principle is that anybody can provide services in the non-reserved area. The subsequent question is then, how does that relate to Japanese and US operators?

That is a very delicate question; it is being negotiated today in Switzerland in the GATT negotiations which have now taken on trade in services and trade in telecommunication services. The Treaty says that the Community can negotiate with third parties to extend such freedom to provide services to other countries, but the Community will, of course, maintain this as a negotiating point and the Commission has received a mandate from the Council in such situations to negotiate, for example, on the basis of national treatment or on reciprocity. The US is very interested in this area; they say we have no barriers and, we would wish to see no barriers in Europe. In fact, the situation that the US in its ONA plans, for example, pays little attention to international standards maybe a *de facto* hindrance of European industry and operators to get efficient access to that market. So I think it is a very important point: within Europe, no barriers; around the world, we would like to see no barriers, and that is subject to negotiation.

***Peter Mackie*:** I would like to respond to the second question about others coming to Europe to take advantage of Open Network Provision if there is not the same reciprocity elsewhere.

If I could look at it from the point of the UK. In effect, we already have that because anyone can come from the rest of Europe to provide value-added services, to provide competing packet switching services, and BT, for example, could not go elsewhere in Europe to the same extent today. I think that is a point worth noting.

Secondly, which was to refer back to a question raised after Mr. Altehage's speech early this afternoon, could BT, for example, go into Germany and provide competitive services? Cor Berben has just answered the general position: yes, we could. As a specific example, Mr. Altehage mentioned the D2 network, the competing cellular GSM network to compete with D1, the Bundespost network. There are a number of consortia in the process of about to bid for that licence and BT is involved in one of those consortia.

***Peter Allen*:** I would like to comment on the matter of standards. Business increasingly operates on a world-wide basis these days. It is thus interested in world-wide standards. I had a small part in the UK input to setting up ESTI and one of the things that I particularly pressed was that users do not want European standards if there are world standards available. But if there are to be European standards, they must then be prompted at the world level. I think that this intent to promote is actually hidden away in ETSI's terms of reference. So far this type of activity has not been started as we have no European standards yet. The main purpose of ETSI, in my view, is to select a common set of European options from those world standards which frequently contain a wide range of options put there in order to obtain a world consenus. Certainly if no world standard has yet been developed then we should produce a European one, efficiently and quickly, and then, as I said, endeavour to make sure that it is adopted as a world standard which enables us all to work together.

***Speaker from the audience*:** I, too, work for Peter Walker's Directorate. I am also an engineer which I will explain now. We seem to get very mixed up with networks and services, and it does concern me when I hear engineers talking about services because they are normally talking about technicalities. I really take the user's view and would like us to listen much more to users. Graham Oliver this morning identified I think four or five things that users look for. In my career I have only ever identified two: to exploit the network, and to pay as little as possible for it.

It seems to me that, when we are looking at all these standards that are coming through, rather than promoting competition we may in fact be preventing competition in some areas. I wonder if I can have the panel's view on that please?

***Peter Walker*:** I think there are certain concerns—I think I expressed them in my introduction—that from the viewpoint of the UK, where we already have a very liberalised environment. Things are changing even now in terms of what different players are allowed to do. Some parts of ONP do seem to be a charter for the protection of some of the European PTTs. It is very encouraging, however, to see the changes that are going on at the moment in Germany; one would like to think they are going to be a model for the whole Community, but nevertheless there are concerns that there will be too much restriction and protection through 'reserved services'.

The other thing is whether or not we will get into a lot of technical discussions and it did seem to me that ONP was really more a regulatory concept than a technical one, but the technical interface is clearly part of the triumvirate of the ONP, and whether or not we will end up with the situation that whereas BTI currently offers about a dozen different types of leased line, maybe in the future will only be able to sell four of them because only four of them are agreed as ONP. I hope not.

***Cor Berben*:** A short addition to that. With regard to standards, it is obvious that there is a whole range of standards, some of which are suitable for mandatory applications, most of which are subject to agreement in industry, and one must be very careful with making standards mandatory. At the same time, I hope we have made clear that other offerings will remain possible because it would be impossible to standardise everything within a topic like ONP.

I want to add to that, the trilogy seems to be a bit hindering to some of us here. The trilogy should not be seen as a very tight framework which applies in all situations to the same extent. In some cases, technical harmonisation is very important and tariffs are relatively of little importance. In that respect, each area for ONP will be addressed individually.

Let me take the example, because it has been given, of what is a basic service and is public data communication a basic service? It is an area where the Green Paper implementation plan said public data communication needs special consideration and, in fact, if you look at those countries who are farthest with liberalisation of public data networks—and I want to stress that that's the position of the Green Paper, clearly—those countries, at the same time, have maintained a universal service obligation for its main operator for that service. What you see here is that public data networks are so important because value-added services largely depend on them. At the same time, it is at the edge of competition—most likely it will be in competition; therefore, I would say, typically in public data networks the harmonisation of standards is very important because you want to ensure that such services can be used over the whole of a geographic area. The tariff principles seem to be much lighter in an area where competition most likely will take an importance place.

***John Metcalfe*:** I think I ought to say that in respect of work being done on areas other than leased lines, in the view of the Government, this work has the nature of being rather hypothetical because the Government has not agreed that ONP should be extended beyond the reserved area which we understand to mean leased lines. Here we do take literally what the Green Paper said, and, as was quoted from it earlier, the only area that the Commission then envisaged as being continually subject to reservation was voice telephony.

***Speaker from the audience*:** I had been dealing with the question of harmonisation in many forms, including Europe. I have not had the pleasure of knowing all that the Commission has done, but there are some dangers which all that has happened so far has done nothing to improve the situation. For example, the industry—and at one time I was Secretary General of an international trade association if you care to put it in rather cynical terms—which was dealing with radio aspects was burdened with a situation whereby type approvals of the equipment were different in different countries, the regulations were often subjective, deliberately so, with the object of preserving laboratories and monopolistic positions, notwithstanding what has been said in other circles. I think there is one thing I would like to ask all the people here, and especially our friend from the Commission, can you possibly get a situation on all the things we have been talking about? Today's Open Network Provision is no exception, and that is if any regulation or approval is arranged with one country, it should be immediately accepted by all the other countries At the present moment, industry is wasting an enormous amount of time and treasure, and losing out to many other countries. America has a much more flexible system in this respect. I would like to ask are you addressing this question which really is the survival of Europe's industry and beating or even improving what others are doing? That should be our objective.

***Cor Berben*:** I understand that you consider harmonisation very important but not very successful until now. I would tend to agree with it. I think one of the reasons that the European Commission attached so much importance to telecommunications is that the process was in danger: the terminal equipment market, our providers of public switches, they were all in a very difficult situation so the Commission has stepped in to put a bit more power, I would say, to the very much appreciated work of CEPT and ETSI.

If you then look at what the Commission has done after the Green Paper, one of the most important ones which quickly came about was the directive on the liberalisation of terminal equipment. What you describe as being a problem of industry is exactly being addressed in that directive, saying to member states that within an agreeable period of adaptation all of you will have to liberalise the terminal equipment. You then have the additional problem that the requirements in different member states are different because the networks are different. There the Commission has taken in its directive a very clear stand. Where there is a European standard, only the European standard can be used to define the requirements on the terminal equipment for access to the network. Where there is no European standard, then national standards can be applied until ETSI has agreed on the European standard which is then lifted to a higher level. In the period that national standards prevail, these must adhere to the essential requirement; no country can say the terminal must adhere to very specific quality requirements. What has been defined essential requirement is a very narrow band: no harm to the network; no harm to the user; certain interoperability requirements in justified cases—for the telephone set, one has to adhere to a certain attenuation plan.

In that sense, I would say we are trying to give the answer. It is a very complicated issue because in any area in Europe you will see that member states have, although a converging attitude, different perceptions of the speed and the degree. But that is not unique in telecommunications; you find that in environment, in agriculture, anywhere. The fact that we are doing this is, in fact, achieving convergence to a certain acceptable compromise, and I think that is very important for the UK. One cannot construct Europe by saying this is the UK point of view, this is the best and therefore we insist that 11 other member states accept exactly the same views. It is a rather difficult process and the Commission is in the middle of it. We are trying to do the utmost to come up with proposals which give enough flexibility to be acceptable to the fastest country in liberalisation and not losing the rest of Europe. I must say that there was this question about the rest of the world; we get a lot of recognition from the other EFTA countries, from the United States, in this type of exercise because they see the importance. We, first of all, see the problems but I think the challenge is so important that we have no problem in insisting that member states discuss these problems and come to acceptable solutions.

I would say with regard to the leased line issue, the infrastructure is very important, effective access to infrastructures is very important. Open Network Provision is going to be extremely important in the era of intelligent networks because efficient access to networks does contain certain facilities to access databases which are commonly used by operators and by private service operators. For example, in the issue of international closed user groups, you see the problems coming up and one cannot say that an international closed user group is a monopoly service. It can be done in other ways but the network itself contains such rich features to do it efficiently that it is worthwhile to look not only strictly at what is in the monopoly area but include something which we call efficient access to infrastructures.

***Peter Mackie*:** Just going back to the question which was just asked about harmonisation. I firmly believe that we should be forward-looking and that we should be looking at harmonisation of new services. As Graham Oliver touched on this morning, it is not particularly fruitful to spend an awful lot of time trying to harmonise what already exists. We have an awful lot of analogue switches and analogue networks out there still, and it is not a particularly fruitful exercise to try and harmonise terminal standards for those networks. It would waste a lot of effort and the scarce resources which are available. So if we are looking at harmonisation, we need to start early and we need to look at things coming up, not things that have been in existence for a long time.

***Bill Medcraft*:** I have a written question here, I will read it out in a moment, but I think this would be addressed to you, Cor. Most of what I have heard, personally, today focuses on driving back the frontier to the regulated network, being the basic infrastructure and the switched telephone service, virtually where we are in the UK. You did mention earlier that there would be the flexibility for individual members of the Community to adopt different approaches and you mentioned very briefly the duopoly in the UK, but I think this question is really directed at getting down at the infrastructure. If I can just read it.

It is from Mr. Nander in BTUK Business Strategy. 'If ONP is not seen to be working, that is, tariffs are not being re-balanced fast enough or the telecommunications administrations are not perceived to be reducing their domination, will pan-European trunk carriers, as in the US and in Japan, be introduced to increase competition and force the pace of change? Who might these be?'

***Cor Berben*:** It is a very interesting question because one of the ways in which the infrastructure problems could be solved is to have a Europe-wide public operator for the infrastructure. I do not think the climate is there, we certainly would not discourage it. If CEPT was functioning to the maximum of its extent, then many of the operational problems with regard to interconnection and standards could be solved; 26 countries who have to decide by unanimity obviously create a problem.

I would say that a pan-European operator is not something which we disregard, certainly not dislike, but it is not an initiative which one normally can expect from the European Commission.

***Peter Mackie*:** It is a fascinating question. As Cor Berben has indicated, if things were working properly now the question should not even be raised, but I would have thought that that sort of possibility is not within, certainly, this century because in most of Europe at present we do not even have competing operators on a national scale and this question really suggests competing pan-European operators. I would think the chances of getting agreement on that sort of proposal were pretty slim.

***Peter Allen*:** The question rightly points out that the key problem is, in fact, that tariffs are not balanced in relation to costs. If that is resolved then there is no cream to skim and everything becomes much freer and more open, and problems are removed. I strongly believe that, as in the UK, there should be a drive to re-balance tariffs. Maybe there should be some way to encourage that, to bring it along more rapidly in Europe. At the moment, in statements by the Commission which have been published, it is all left a little vague—if re-balancing, or if tariffs do not align more with costs, the matter will be reviewed. Certainly tariffs which align with costs are the key to the problem; that problem has been tackled in the UK where we have, I believe, a solution now.

***Peter Walker*:** I agree with the previous speakers that, if tariffs become re-balanced, there is not a problem and, yes, in the UK we are more re-balanced than most other countries in Europe. But it was actually competition for the basic telephone service that caused that to happen, something which is almost excluded by the current proposals of the Commission. Therefore, I do not see the strong motivation for all administrations to re-balance tariffs in that way.

An interesting reflection about the structure of European telecommunications is that Europe is a collection of relatively small countries that in total telecommunications traffic and trade is about the same size as North America. In my business as an international operator, I am very conscious of the fact that to communicate with North America I do not have to talk to too many points; in fact, in total there are, for the telephone service, in the whole of North America—Canada and US—even with the competing carriers, I believe just 19 gateway switches. There are something like 96 in Europe, most of which BTI connects to. It is a reflection that the whole structure of our network is geared up on a national basis, to the traditional correspondent connection. Certainly, a pan-European operator would not set up 92 connection points in that way to serve Europe. Certainly the idea of a pan-European carrier that would be able to exploit modern high-bandwidth technology has certain attractions to it.

***Bill Medcraft*:** I think it is interesting to reflect that, if there was competition in the infrastructure and we had a pan-European network, would it bring together the apparent dichotomy we have at the moment between American standards and the European standards for the basic network services? Another point I reflect on is if it is good for the UK, it is interesting to see whether it is good for Europe.

***John Metcalfe*:** I thought I should just like to say that the UK position is not that Europe must align itself on the UK, either in respect of tariff re-balancing or in any other respect. Of course, we believe that it will be good for Europe to liberalise and it will provide a market for efficient and competitive UK service providers, but we fully recognise that there are serious problems in some other member states, either because they have not re-balanced yet or because their economic development is not such as to support full liberalisation yet. Therefore, I think we are looking towards a gradual process, what I think the Commission calls a 'progressive process', step by step, which will give other member states time to re-balance and time, we hope, to achieve that state of development of their telecommunications network which would support full liberalisation. In the meantime, however, it is the UK's firm policy that nothing in the Community should cause the United Kingdom to level down its standards of service to customers, opportunities for service providers or the competitive environment in which the network operators now successfully, I hope, exist.

***Speaker from the audience*:** I think it has been very refreshing to me and perhaps a lot of others, the fact that as engineers we have been exposed to a very interesting day where the prime subject has been commerce; I have particularly enjoyed that.

It has been particularly interesting to hear the comments from the table today about the use of regulation in the UK which does rather appear to be contradicting the market forces argument and, in fact, I think the use of regulations do constrain BT for obvious reasons. One thing that we have been continually talking about throughout the day is the effects on the network providers, the PTTs, and the service operators. One thing that has not come up, that I am particularly interested in, is with the mechanisms in Europe for the development of standards, is there any likelihood of a dominance by manufacturers or are there any mechanisms being taken to avoid that?

The reason for that question is, obviously, telecommunications is moving very much towards computing and there are various attempts being made by specifically computer manufacturers such as IBM to introduce networking-type standards and, of course, there are vested interests among equipment manufacturers themselves. I would be particularly interested in Cor Berben's response to that.

***Cor Berben*:** The effects on industry. If there were to be an effect leading to dominant positions, the Commission would act. We have no reason whatsoever to say today that dominant positions are emerging. The industry of public equipment is rather too fragmented; there has been a perceived threat that companies like IBM and DEC would try to emerge themselves in this market. I do not think that point of view is really sustainable; the basic transport of communications contains too little profit for companies like DEC and IBM to be really aiming at that market. Where they have tried, in fact, they have not been very successful. So we are certainly vigilant in that respect but I do not think that today it would be justifiable to see threats appearing on the horizon.

***Speaker from the audience*:** One of the more entertaining aspects of the American telecommunications scene, if you do not happen to be involved in it, is the fact that they have competition in all aspects including regulation, with the various state and federal agencies bickering with each other for control over what the Bell Telcos are and are not allowed to do, and eventually the Department of Justice and the courts have to resolve the issue. Is there a danger that when we go down the Open Network Provision route in Europe and have a set of mandatory standards plus a series of general guidelines on standards which should be adopted by various national administrations, we will find ourselves in this similar unattractive position of the federal regulator in the European Commission arguing with the national regulators in the individual countries and the whole matter having to be thrashed out in the European courts?

Bill Medcraft invited Cor Berben to respond, who, in turn, asked the speaker to clarify the last part of the question.

The problem that I see is an unpleasant scenario for Europe in the mid-1990s where we have a federal regulatory authority in the European Commission, 12 national regulatory authorities with differing views, a complex mix of mandatory standards, memoranda of understanding about voluntary standards which will be implemented, general guidelines that relate to the provisions of the Treaty of Rome which may or may not make it necessary for someone to implement a standard. Is this likely to create a situation where we will have disagreements between the federal and the national regulator and the rather unattractive possibility of the things having to be resolved by either national or the European court?

***Cor Berben*:** First, the regulatory aspects at the European level and at the national level. A very important principle in that type of regulation is what we call the *principle of subsidiarity*; so you regulate at the European level what is necessary to be regulated at the European level, and you regulate at the national level, or at the regional level, what is more suitable for such type of regulation. In that respect, we try to be very careful to restrict ourselves to those issues which are important and which have an impact on, let us say in this case, Community-wide trade.

With regard to the standards issue, some of them being mandatory, some of them being advised, some of them being voluntary, I think that is unavoidable. We have many activities also in the European Community, and I mention the TEDIS Project, for example, where the European Commission is clearly supporting the promotion of standards in electronic data interchange on the basis of the EDIFACT standards so that facturation, etc., can be done at a European level. This is clearly not a mandatory type of standard but it is important. So the fact that there are standards with different levels of imposition is unavoidable and we will have to cope with that.

Bill Medraft closed the session by thanking the panel members for their time and their uninhibited responses to the questions.

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